

# PORT OF LIVERPOOL.



## ANNUAL REPORT

OF THE

## MEDICAL OFFICER OF HEALTH

TO THE

## PORT SANITARY AUTHORITY.

FOR THE YEAR

**1924.**

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# PORT SANITARY AUTHORITY

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REPORT FOR THE YEAR 1924,

BY THE

MEDICAL OFFICER OF HEALTH.

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In accordance with the duty imposed by the Local Government Board in the General Order, dated March 23rd, 1891, the following Report of the operations of the Liverpool Port Sanitary Authority for the year 1924 is herewith submitted.

The Report covers the work of the Authority during the year, and includes references to the following:—

(a) Measures adopted under the Cholera, Plague and Yellow Fever, and Allied Orders of the Local Government Board, and under the Port Sanitary Authorities (Infectious Diseases) Regulations, 1920.

(b) The measures taken to reduce the number of rats on dock quays and on ships and to ascertain the existence of plague amongst any such rats.

(c) Action taken in regard to the sanitation of vessels.

(d) The inspection of imported foods under the Orders of the Local Government Board.

(e) The Medical Inspection of Aliens under the Aliens Order, 1920.



The limits of jurisdiction of the Port Sanitary Authority are those of the Customs Port of Liverpool as defined in the Treasury Warrant of November 3rd, 1896, which are as follows:—

From the Red Stones in Hoylake on the Point of Wirral and continued up the river Mersey on the Cheshire shore to the Western side of the entrance to the Manchester Ship Canal at Eastham. Thence in an easterly direction across the said entrance and along the Cheshire shore of the river to the Ince Ferry, the western termination on that shore of the Port of Manchester. Thence crossing the said river Mersey in a supposed straight line to Dungeon Point, being the western termination on the Lancashire shore of the said Port of Manchester, and continued along the coast of the County of Lancashire to the southern boundary of the Port of Preston, *i.e.*, an imaginary line drawn in a true north-north-west direction from the inner north-west sea-mark on the beach at Formby Point. And the said Port shall include all islands, rivers, bays, channels, roads, bars, straits, harbours, havens, streams, and creeks (except the said Manchester Ship Canal) within the said limits contained, and shall extend sea-ward to a distance of three miles from low water-mark along the coast within the aforesaid limits.

The contributing Riparian Authorities are the Urban Sanitary Authorities of Birkenhead and Bootle and the Urban District Councils of Bebington and Bromborough, and Wallasey.



TABLE 1.  
AMOUNT OF SHIPPING ENTERING THE PORT SANITARY DISTRICT DURING THE YEAR 1924.

Class of Vessels.		Number.	Tonnage.	Number Inspected.		Number reported to be Defective.	Number of Orders Issued.
				By the Medical Officer.	By the Sanitary Inspector.		
FOREIGN—		(1)	(2)	(3)	(4)	(5)	(6)
Steamers	...	*7,163	12,705,973	715	3,916	616	—
Motor ...	...	151	286,989	—	Not differentiated	—	—
Sailing	...	79	20,693	—	5	—	—
Fishing	...	—	—	—	—	—	—
TOTAL FOREIGN		7,393	13,013,655	715	3,921	616	—
COASTWISE—							
Steamers	...	6,904	2,197,442	17	1,216	23	—
Motor ...	...	1,244	92,105	—	Not differentiated	—	—
Sailing	...	280	28,079	—	57	1	—
Fishing	...	—	—	—	—	—	—
TOTAL COASTWISE		8,428	2,317,626	17	1,273	24	—
TOTAL FOREIGN AND COASTWISE		15,821	15,331,281	732	5,194	640	—

(Includes mechanically-propelled vessels other than steamers.)  
\* Figures in columns 1 and 2 supplied by H.M. Collector of Customs for this Port.

### Infectious Diseases.

Local conditions in the Port of Liverpool render it impossible to arrange that every vessel arriving from foreign ports should be inspected by one of the Port Medical Officers in the river before docking. Consequently it is the practice to issue from time to time a list of ports where dangerous epidemic disease is known to exist and to require that all vessels from such ports should be visited by a Port Medical Officer before being allowed to proceed to dock. Other vessels are required to report if they have or have had cases or suspected cases of infectious disease on board, in which case they also are inspected before docking. The duty of ascertaining whether a vessel requires medical inspection and of reporting to the Port Sanitary Authority falls upon the Pilots, who are provided with the current list of infected ports and have standing instructions to ask the Masters of all incoming vessels whether any cases or suspected cases of infectious sickness have occurred during the voyage, and to notify the Port Sanitary Authority if the answer is in the affirmative. Assistance is also given by the Officers of H.M. Customs, who notify any cases of sickness reported to them and by the various Shipping Companies, who usually inform the Port Sanitary Authority if they have knowledge that infectious disease has occurred on any of their ships bound for Liverpool. Further, all ships are visited by an Inspector of the Port Sanitary Authority as soon as possible after arrival in dock. The Inspectors enquire into the occurrence of any sickness during the voyage and then proceed to an examination of the sanitary condition of the vessel. Matters requiring the attention of the Port Medical Officer are promptly communicated to him by telephone. There would therefore be little chance of the deliberate concealment of infectious disease, and such is never attempted. Now that practically all ships are fitted with wireless and the fear of quarantine no longer haunts the Masters of vessels with sickness on board, information is freely given to the Port Sanitary Authority. There must, of course, arise cases which the Masters of ships cannot diagnose, but if they suspect a case to be infectious they do not hesitate to report to the Port Sanitary Authority by wireless, a practice in which they are encouraged by shipowners.

The control over imported infection is, therefore, very thorough. There is always the possibility of persons arriving from abroad in the incubation stage of an infectious disease. The more rapid the means of

transport the more likely are such instances to arise, and one may speculate on the possibilities in this connection if aerial transport becomes common. Where there is danger of persons arriving in Liverpool in the incubation stage of smallpox, shipping companies are required to furnish complete lists of passengers and crew with their addresses of destination in this country. Such lists are filed, and in any case develops a complete list of contacts is available, and Medical Officers of Health can be immediately notified of the address of contacts in their areas. The very complete Public Health organisation of this country enables the maximum of control over imported infectious disease to be attained with the minimum of interference with the movement of passengers.

In connection with the prevention or detection of various infectious diseases, samples are frequently sent to the City Bacteriologist or City Analyst for report. During the year five samples of water from ships were examined for evidence of contamination.

Following a series of cases of diphtheria eight swabs from throats of persons in contact were reported on, and in connection with an outbreak of typhoid fever, sixteen blood and other specimens were examined by the Bacteriologist.

### Smallpox.

S.S. "LISBON."—This vessel arrived from Oporto on March 26th. The patient was one of the crew. He was infected with Smallpox in Oporto on March 16th, and developed the disease after proceeding to his home. All immediate contacts were re-vaccinated and the usual disinfections carried out. No extension occurred.

S.S. "CALIFORNIA."—Arrived at Liverpool on April 23rd from Bombay, and the surgeon reported that two cases of smallpox had occurred amongst the crew. The first occurred on 7th April, and was landed at Suez on April 11th. The second case sickened on April 10th, the eruption appearing on April 13th, and was landed at Marseilles on April 17th.

S.S. "CITY OF PARIS."—This vessel arrived at Liverpool on 30th May, and the surgeon reported that one case of smallpox had occurred during the voyage. The patient was a native fireman who joined the ship at



Karachi. The vessel left Karachi on May 7th, and this fireman reported sick next day. On May 10th the eruption of smallpox appeared, and the patient was isolated in one of the boats which was swung out, there being no hospital on the ship. A native who had had smallpox was detailed to attend the case. All contacts were vaccinated and the crew's quarters disinfected. The patient was landed at Suez on 18th May. No secondary cases occurred.

S.S. "SALAGA."—This vessel arrived at Liverpool, and the ship's surgeon reported that six cases of smallpox had occurred amongst native deck passengers, who embarked at Secondee on September 7th. The first case occurred on September 13th, the second case on September 15th, and on September 16th, four more cases were discovered. The patients were isolated in ship's boats swung out, and were landed at Monrovia on September 18th. Vaccination of passengers and crew was carried out at Freetown on September 19th. All were well on arrival at Liverpool.

### Enteric Fever.

On May 12th, 1924, a large passenger vessel arrived at Liverpool on completion of a tour.

The vessel was boarded by the Assistant Port Medical Officer, and the ship's surgeon reported that the First Officer had died on the morning of arrival, from Intestinal Hæmorrhage. Two patients in hospital were seen by the Assistant Port Medical Officer, and diagnosed as Enteric Fever, and the Chief Steward, who was going about, but feeling ill, was also found to be suffering. These three cases were removed to Fazakerley Hospital. Subsequently, four other members of the crew were notified, from their homes, making, with the Chief Officer (who undoubtedly died of hæmorrhage from a typhoid ulcer), a total of eight cases on the ship. Specimens of blood were taken from six members of the stewards' department who might have been carriers or mild cases of disease. Two gave positive Widal reactions, but no typhoid bacilli could be isolated from other specimens sent to the Bacteriologist, and the blood reaction was probably due to anti-typhoid inoculation. It was reported that the Cook for the crew had been landed at Bombay on April 11th suffering from Appendicitis. His wife informed the Public Health Department that he, too, had Enteric Fever. This appeared to explain the outbreak.

The Cook was seen and examined some weeks later on his return to this country, the original diagnosis of Appendicitis was found to be correct.

The first infection probably took place at Bombay, but the actual source was not discovered owing to the fact that the nature of the disease was not recognised till the vessel arrived at Liverpool.

### **Plague.**

No cases of Plague, either human or rodent, were imported into or occurred in the Port of Liverpool during 1924.

### **Cholera and Typhus Fever.**

No cases of either of these diseases was brought to Liverpool during the year.

### **Anthrax.**

Six cases of Anthrax infection were reported during the year from City warehouses, tanneries, etc., but no case of actual infection amongst Dock Labourers was reported on the Dock areas, during the handling of hides, wool, or other animal product, during the unloading of the cargoes.

During the year 210 samples of wool and hair, etc., were examined for the Government Wool Disinfecting Station—two samples of each material were sent, one before, and the other after disinfection—six of the untreated samples were found to be infected with *Anthrax Bacilli*, but all the disinfected ones were sterile.

### **Grain Dermatitis.**

In October several grain shipments arrived in this country from Morocco, and gave rise to an irritation of the skin, amongst those who discharged the grain.

The vessel which arrived in Liverpool docked on the 27th of October, and commenced to discharge on the 28th. Ten labourers employed in the discharge of the Barley complained of skin irritation. These were followed on the 29th and 31st by five others similarly affected.

The skin irritation associated with the discharge of the Barley at Liverpool was also stated to have been experienced in Bristol and Southampton, in the discharge of similar cargoes at those ports.



The condition showed itself very soon after the work was started as a closely set papular eruption on the arms, neck, face, and slightly on other parts, such as the back and chest. Considerable irritation and annoyance is caused, but little harm results. It is due to a mite (*Pediculoides ventricosus*) which infests the grain. Under treatment the condition rapidly disappeared.

This mite was found in the barley. It rapidly disappears after storage, and is with difficulty found even in the screening. Samples, however, may be found, in which the mites are plentiful. Medical literature referred to the subject at the time; it was interesting to note that it was recorded that at a certain port the mites were blown in the dust created during the discharge, and were carried some distance into neighbouring houses, where they gave rise to the same condition amongst the occupants.

### Rats.

One of the principal duties of the Port Sanitary Authority is to protect the Port from the plague infection. Plague is a disease of rats, communicated to man by the bite of the rat flea, consequently measures against plague entail a campaign against rats, which is organised as follows :—

The Port Sanitary Authority has a staff of Rat Catchers and Rat Searchers. The duty of the former is to catch rats on as many ships and as many quays as possible, not with the object of reducing the number of rats, but with the idea of sampling the rat population widely and frequently, so that imported rodent plague may be immediately detected and steps may be taken to prevent the spread of infection to the rats on shore. The total number of rats caught by the Port Sanitary staff could be greatly increased if the rat catchers confined their operations to the ships and quays where rats are known to be most numerous. But they are not permitted to do this, and must move their traps elsewhere as soon as they have obtained a fair sample of the rats in any ship or dock area. Attention is first given to those vessels



arriving from ports which are known to be infected with rodent plague, and to the particular quays at which such vessels berth; but the whole area of the dock estate is systematically covered from end to end.

The actual work of reducing the numbers of rats on board ship is the duty of the shipping companies, and is effected partly by the constant employment of professional rat catchers and partly by fumigation. The majority of fumigations of ships are carried out because certain other countries, notably U.S.A., require vessels trading with them to be fumigated for rat destruction at regular intervals, and call for a certificate from the Port Sanitary Authority that such fumigation has been efficiently carried out in accordance with certain definite instructions. But from time to time the Port Sanitary staff discovers that a ship is "ratty" and then they may require fumigation under the Rats and Mice Destruction Act. In practice it is found that when the evidence of serious rat infestation is presented to the Shipping Company they shew their confidence in the Port Sanitary staff by immediately acceding to the request for fumigation, and it has never been necessary to issue a statutory notice under the Rats and Mice Destruction Act.

When a vessel is infected or suspected to be infected with plague, the vessel is fumigated by and at the expense of the Port Sanitary Authority, who keep a store of the necessary equipment and materials ready for immediate use, and whose staff are all experienced in the practice of fumigation.

The reduction of the numbers of the rats on shore is brought about by the only measures which are permanently effective, viz., the elimination of rat harbourage. Fortunately, the sheds on the Liverpool Docks are practically all rat-proof construction, that is to say, if the shed was empty and clean, there would be no possibility of a rat burrowing in the floor or walls, or making a nest and bringing up a family in safety. Further, the sheds are nearly all transit sheds, so that inward cargo is quickly removed and replaced by goods for outward shipment.

Consequently rats cannot nest amongst the cargo. But if little wooden offices were just dumped on the floor, rats would burrow underneath and live and breed there. Similarly if sweepings of the shed are allowed to accumulate in corners, and if the varied gear necessary for the working and equipment of ships is not properly stored, excellent harbourage may be provided for rats. Such points need constant attention, and one Inspector of the Port Sanitary Authority devotes most of his time to the inspection of the dock estate for rat harbourage, and to interviewing the persons responsible for remedying unsatisfactory conditions. The results of his work cannot be shewn by figures, but the standard maintained is very high. Moreover, the officials in charge of dock sheds, etc., are beginning to appreciate the importance of the elimination of rat harbourage, and even to admit that it pays, so that we may hope in the future to see that instead of the Port Sanitary Authority having to order the removal of rat harbourage, such conditions are never allowed to develop.

The Rat Searchers of the Port Sanitary Authority visit ships and dock quays in order to look for sick or dead rats amongst cargo, and also to estimate the degree of rat infestation of ships or premises. The importance of their work has been demonstrated in the past by the fact that rodent plague on board ship has only come to light by the finding of dead rats amongst the cargo, which on bacteriological examination have proved to be infected with plague, rats caught alive on the same ship being healthy. There is complete co-operation between the rat catchers, the rat searchers, and the inspector of rat harbourage. For example, the rat catchers may catch a large number of rats very quickly on a ship, the rat searchers find evidence of serious rat infestation, the inspector notes the facts, confirms the findings by a personal visit, and a request for fumigation is sent to the shipping company. Or, rat searchers find evidence of rats in a store room and discover how the rats gain access. The ship is visited by the inspector, who sees the conditions for himself, decides on the remedy, and gives instructions for its application.

It is thus obvious that though the tables in this report shew the numbers of rats caught, the efficiency of the rat-repressive measures cannot be judged by these figures alone. The campaign against rats in the Port of Liverpool is based on sound principles, and is actively pursued on reasonable commonsense lines.

TABLE 2.

PARTICULARS RELATING TO VESSELS "INFECTED" OR "SUSPECTED," OR FROM INFECTED PORTS.

NUMBER OF VESSELS.			METHODS OF RAT DESTRUCTION EMPLOYED.			Whether a Certificate of Deratisation was Issued.	Number of Rats Killed.	Remarks.
Infected.	Suspected.	From Infected Ports.	Fumigation by Sulphur Dioxide.	Fumigation by Hydrocyanic Acid.	Trapping, Poisoning, etc.			
1.	2.	3.	4.	5.	6.	8.	7.	9.
Nil.	Nil.	*502	20	Nil.	412	20	3,338	

\* (Includes 70 Manchester-bound Vessels.)

TABLE 3.

VESSELS (OTHER THAN THOSE DEALT WITH IN TABLE 2) SUBJECTED TO MEASURES OF RAT DESTRUCTION.

Number of Vessels Fumigated by SO2.	Number of Rats Killed.	Number of Vessels Fumigated by HCN.	Number of Rats Killed.	Number of Vessels on which Trapping, Poisoning, etc., were employed.	Number of Rats Killed.	Number of Fumigation Certificates Issued on Form "Port 10."	Number of Other Certificates Issued.	Remarks.
1.	2.	3.	4.	5.	6.	7.	8.	9.
106	*6,107	5	105	383	3,959	72	25	

\* The above figures include 211 mice.



TABLE 4.

TABLE SHOWING THE NUMBER OF RATS AND MICE OBTAINED ON SHIPS AND QUAYS  
BY THE AUTHORITY'S RAT-CATCHERS.

Year.	NUMBER OBTAINED.			NUMBER			DESTROYED.		
	From Ships.	From Quays.	Total.	EXAMINED.		Total.	From Ships.		Total.
				From Ships.	From Quays.		From Ships.	From Quays.	
1915	9,400	1,256	10,656	6,204	1,234	7,438	3,196	22	3,218
1916	10,881	1,678	12,559	7,064	1,312	8,376	3,817	366	4,183
1917	9,174	1,551	10,725	6,379	1,457	7,836	2,795	94	2,889
1918	7,251	1,188	8,439	5,541	1,159	6,700	1,710	29	1,739
1919	8,971	1,336	10,307	6,023	1,287	7,310	2,948	49	2,997
1920	8,088	1,593	9,681	5,276	1,517	6,793	2,812	76	2,888
1921	8,867	2,405	11,272	5,031	2,195	7,226	3,836	210	4,046
1922	10,642	2,830	13,472	5,520	2,519	8,039	5,122	311	5,433
1923	12,097	1,625	13,722	5,629	1,460	7,089	6,466	167	6,633
1924	*13,509	1,963	15,472	4,981	1,658	6,639	8,528	305	8,833
Total.....	98,880	17,425	116,305	57,648	15,798	73,446	41,230	1,629	42,859

\* 7,228 rats and 212 mice were obtained after fumigation and 125 mice are also included in these figures.

TABLE 5.

NUMBER AND SPECIES OF RATS CAUGHT, EXAMINED, OR DESTROYED, RESPECTIVELY, IN THE CITY  
AND PORT OF LIVERPOOL, DURING THE YEAR 1924.

1924.	Warehouses.		Sewers.		Other Places.		Total.		Ships.		Quays.		Other Sources.		Total.	
	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.
January ...	99	237	—	572	1	530	100	1,339	1,593	1	29	41	84	24	1,705	66
February ...	63	189	—	560	2	367	65	1,116	676	3	65	8	110	12	851	23
March ...	161	223	—	660	52	539	213	1,422	1,796	1	70	6	76	10	1,942	17
April ...	111	261	—	507	31	537	142	1,305	527	—	57	21	14	4	598	25
May ...	113	284	—	600	6	692	119	1,576	1,122	—	69	16	2	1	1,193	17
June ...	47	251	—	551	4	431	51	1,233	890	—	67	13	38	4	995	17
July ...	83	188	—	589	9	405	92	1,182	1,005	1	45	5	17	2	1,067	8
August ...	67	241	—	411	2	582	69	1,234	875	—	34	9	17	3	926	12
September ...	58	201	—	620	9	431	67	1,252	1,324	—	99	34	33	3	1,456	37
October ...	72	215	—	615	8	614	80	1,444	1,065	—	109	37	95	14	1,269	52
November ...	65	165	—	472	1	480	66	1,117	1,506	2	100	10	159	31	1,765	43
December ...	56	146	—	425	—	380	56	951	911	—	86	5	45	4	1,042	9
TOTAL ...	995	2,601	—	6,582	125	5,988	1,120	15,171	13,290	8	830	205	690	112	14,809	326

TABLE 5.—Continued.

1924.	Examined (City).		Destroyed (City)		Examined (Port).		Destroyed (Port).		Total Caught.
	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	City and Port.
									Black and Brown.
January ...	18	155	82	1,184	552	37	1,153	29	3,210
February	5	168	60	948	495	10	356	13	2,055
March ...	19	130	194	1,292	571	17	1,371	—	3,594
April ...	18	178	124	1,127	412	20	186	5	2,070
May ...	8	155	111	1,421	520	13	673	4	2,905
June ...	5	129	46	1,104	429	17	566	—	2,296
July ...	9	92	83	1,090	353	8	714	—	2,349
August ...	4	105	65	1,129	506	12	420	—	2,241
September	12	150	55	1,102	509	28	947	9	2,812
October ...	14	164	66	1,280	618	51	651	1	2,845
November	12	136	54	981	675	36	1,090	7	2,991
December	3	129	53	822	608	9	434	—	2,058
TOTAL	127	1,691	993	13,480	6,248	258	8,561	68	31,426

6506 Rats caught in the Port Area and Bacteriologically examined proved not to be infected with plague,



TABLE 6.

The combined returns of all rats and mice caught and destroyed by shipping firms employing their own rat-catchers, by rat-catching companies, and by the Public Health Authorities, during the year 1924, are as follows:—

	Rats.	Mice.	Rats.	Mice.
PORT—				
On vessels ... ..	44,825	211		
On quays ... ..	1,837	126		
			46,662	337
CITY—				
In warehouses ... ..	9,709	32		
In sewers and from other sources ...	6,582	—		
			16,291	32
		TOTAL ...	62,953	369

Number of Visits to <b>Vessels</b> by Rat Catchers	...	...	3,460
Do. do. do. Rat Searchers	...	...	4,501
Do. do. <b>Quays, Sheds, etc.,</b> by Inspectors	...		620
Do. do. do. do. Rat Searchers			1,194
Do. do. do. do. Rat Catchers			3,806

### Experiments in the Destruction of Vermin.

It has been felt for a considerable time by the Officials of the Department and by various Shipping Companies who are keenly interested in maintaining the living quarters on their vessels free from vermin, that an effort should be made to ascertain the lethal effects on vermin of the different gases employed in the fumigation of ships.

Arrangements were, therefore, made with Professor Newstead, of the Liverpool University, to carry out, with the assistance of the Port Sanitary Staff and in conjunction with the City Analyst, a series of experiments on the effects of Hydrocyanic acid gas.

The experiment showed the effects of this gas on rats, bugs, fleas and lice. A full report of the work is given in the appendix.

### Venereal Diseases.

The following short account is given of the facilities existing in the City and Port of Liverpool for the diagnosis and treatment of Venereal Disease.

It is found that a large proportion of the male patients are seafaring men, and there is little doubt that they contribute in a large measure to the spread of infection.

The City Clinics are dealt with first, and the work at the Seamen's Dispensary is then described in more detail.

It is now six years since free treatment centres and arrangements for expert diagnosis were established under the Liverpool Venereal Diseases Scheme, which includes the following :—

1. That opportunities should be afforded to sufferers to have free and expert treatment.
2. That extended facilities should be provided for the diagnosis of these diseases.
3. That information as to the dangers of Venereal Diseases should be disseminated and particulars as to the facilities provided for free treatment.

The following summarises the work of the Treatment Centres for the year 1924.

The Clinics now in operation are—The Royal Infirmary, the Royal Southern Hospital, the David Lewis Northern Hospital, the Stanley Hospital, and the Seamen's Dispensary.

The Clinics which were established are very serviceable and popular. Patients attending the Out-Patients' Department of the Hospitals and found to be suffering from Venereal Diseases are directed to the Department dealing with their special ailment, particular care being taken that patients suffering from Venereal Disease are not singled out or made conspicuous.

During the year under review, there were, excluding the Seamen's Dispensary, 2,697 new patients, male and female, a reduction of 329 as compared with the figure for 1923. But apart from this, the value of efficient free treatment and education is beginning to make itself evident.

The attendances for the year at all the Clinics, excluding the Seamen's Dispensary (see below), totalled 47,540 male and female. A table shewing attendances, etc., at each of the Clinics is given, and also details of the diseases and sexes dealt with at the largest centre, namely, the Royal Infirmary.

RETURN SHOWING THE NUMBER OF NEW PATIENTS ATTENDING THE VENEREAL DISEASES CLINICS DURING THE YEAR 1924. ALSO TOTAL ATTENDANCES AND IN-PATIENT DAYS OF OLD AND NEW PATIENTS DURING SAME PERIOD.

	Royal Infirmary.	Royal Southern Hospital.	David Lewis Northern Hospital.	Stanley Hospital.	TOTAL.
New Patients ... ..	1,531	483	364	319	2,697
<b>Old and New Patients—</b>					
Total attendances...	27,896	7,399	6,839	5,406	47,540
In-Patient Days ...	95	3,801	—	406	4,302



CLASSIFICATION OF CASES ATTENDING THE LIVERPOOL  
ROYAL INFIRMARY DURING 1924.

	NEW * CASES			CEASED TO ATTEND BEFORE CURE COMPLETED.			TOTAL ATTENDANCE		
	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.
Syphilis... ..	361	151	512	487	134	621	9,183	3,354	12,537
Gonorrhœa.....	596	78	674	584	78	662	13,401	853	14,254
Soft Chancre . . . . .	1	—	1	1	—	1	11	—	11
Suspected cases— examined and found to be free from V.D.	282	62	344	—	—	—	969	125	1,094
Total .....	1,240	291	1,531	1,072	212	1,284	23,564	4,332	27,896

\* The figures in these columns include “Re-admissions,” *i.e.*, old patients who had ceased attending for more than six months.

The occupation stated to be followed by patients registered at the Clinics at the Royal Infirmary during the year are of interest:—

MALES.		FEMALES.	
Seafaring people .....	349	Housewives .....	133
(Of these 18 were foreign.)		Home duties .....	16
Artizans .....	436	Shop Assistant .....	1
Miscellaneous .....	292	Factory Hands .....	9
(Clerks, Agents, Hawkers, &c.)		Housemaids .....	4
		Waitresses .....	2
		Domestic Servants .....	18
		Other occupations .....	20
		Infants and Children* .....	35
	1,077		238

\* This number includes Male Infants who are brought to the Female Clinic by their Mothers.

In addition, 104 male and 41 female patients who had ceased attending for six months (or longer) resumed their attendances during the year.

32.0 per cent. of the total male patients registered were seafaring people.

5.0 per cent. of the latter were not natives of the British Isles, and are classed as follows :—

U.S.A., 2; Colonies, 2; Norway and Sweden, 3; other nationalities, 11. Total, 18.

The ages range approximately from 15 to over 60 years, but the majority of the patients were between the ages of 20 and 30 years, as shown by the following table, viz. :—

	Male.	Female.
Under 10	2	28
10—15	1	7
15—20	29	16
20—25	267	50
25—30	305	47
30—35	187	36
35—45	186	34
45—55	85	13
55—65	15	3
65 upwards	—	4

The following specimens have been examined from persons known, or suspected, to be suffering from Venereal Disease :—

#### CLINICS.

	Posi- tive.	Doubt- ful.	Nega- tive.	Total.
Wassermann Reactions ... ..	645	211	1,574	2,430
For Gonococci ... ..	47	21	634	702
For Spirochaetes ... ..	2	1	7	10
	694	233	2,215	3,142

## HOSPITALS, PRIVATE PRACTITIONERS, &amp;c.

			Posi- tive.	Doubt- ful.	Nega- tive.	Total.
Wassermann Reactions	...	...	666	169	1,537	2,372
For Gonococci	...	...	33	8	180	221
For Spirochaetes	...	...	—	1	6	7
Still-born Infants	...	...	26	13	359	398
For Ophthalmia Neonatorum	...		14	1	32	47
			<hr/> 739	<hr/> 192	<hr/> 2,114	<hr/> 3,045
Grand Totals	...		<hr/> 1,433	<hr/> 425	<hr/> 4,329	<hr/> 6,187
			<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>

As the majority of the specimens are sent from patients suspected to be suffering from Syphilis, or undergoing treatment, several specimens of blood may be sent from one case at different times, and therefore no percentages as to positive and negative results can be estimated from these figures.

## VENEREAL DISEASES—EDUCATION.

The subject—in its various aspects—of the prevention of venereal diseases has engaged the attention of the Councils of the various Merseyside Boroughs through Committees specially appointed for the purpose, and, as a result of consultations and communications between those bodies, agreements have been reached as to the procedure which it is desirable to follow in regard to the prevention of these diseases.

The work of educational propaganda has now been undertaken with the approval of the Ministry of Health by a Joint Committee, the members of which are appointed by the respective Merseyside Boroughs, viz., Liverpool, Birkenhead, Bootle and Wallasey.

The educational work of this Joint Committee consists in arranging public and other lectures as a means of bringing the subject of the dangers of venereal diseases to the notice of the general public. Funds are provided by the Associated Boroughs in appropriate proportions for the carrying out of this work. A recent development in the dissemination of information regarding venereal disease amongst the seafaring community is the giving of lectures by the Assistant Port Medical Officers to seamen at the Institute, and the inclusion of a lecture in the first-aid course to cadets and apprentices of the mercantile marine.



Experience in Liverpool corresponds with that found elsewhere in regard to the system of free treatment centres, where no obligation is placed on persons suffering from these diseases: the patients too frequently give up treatment when the local manifestations of the disease have subsided. Such persons frequently remain in an infectious condition, and consequently are a great danger to the public. They also lose sight of the great importance of steady continuance under medical advice at the Clinic in the cure of their dangerous ailments.

Endeavours have been made in Liverpool by various means to get these patients back to continue treatment. It cannot be said that these efforts have had much effect.

Suggestions for improvement in our methods of dealing with venereal diseases were made some years ago by the Committees of the Liverpool Corporation dealing with these diseases. For some years it has been felt that the present schemes should be strengthened by the addition of compulsory powers to enable local Health Authorities to compel the sufferer to seek a doctor's advice and to follow it should he be found to be suffering from the disease. Those who, after repeated warnings, deliberately refuse treatment should be punished, and public opinion would justly agree with this course.

If it can be brought home to the patient that it is his duty to himself and to his fellow men to follow a full and proper course of treatment until free from liability to infect others, much good will be attained.

The Liverpool Health Committee consider that this result can be obtained by making it obligatory for everyone who suffers, or suspects he is suffering from Venereal Disease to seek medical advice and to follow the doctor's instructions; in no case will secrecy be betrayed, and it would only be in cases of deliberate discontinuance of necessary treatment that prompt action would be taken by the Health Authority in the public interest.

#### SEAMEN'S DISPENSARY.

The Dispensary is situated in the neighbourhood of the Sailors' Home and Board of Trade Offices, and was opened by the Lord Mayor on the 28th January, 1924. The staff consists of one whole-time Assistant Medical Officer and two Orderlies. One Orderly attends on the Medical Officer during the examination and treatment of patients, whilst the other supervises the routine irrigation treatment of cases of Gonorrhœa. The second Orderly is on duty up to 8 p.m., and resides on the premises.

The average patient is very attentive to treatment, and takes an intelligent interest in his progress. There can be no doubt that the seafaring man, in the great majority of cases, has been educated to appreciate the seriousness of venereal disease, and in many cases is willing to give two or three months of his time in order to be cured.

Probably the most difficult cases to handle are those men who have secured berths on vessels doing short voyages, say from 10 days to 3 weeks. These get insufficient treatment for cure if they continue in employment and they are most unwilling to give up the comfortable posts.

In cases where uninterrupted treatment at the Dispensary cannot be given, various methods are employed to assist in the continuance of treatment.

1. Form V 15a is issued.

This is a small book where the essential particulars of the patient's case and treatment are entered, and any Medical Officer can continue the treatment provided he possesses the necessary facilities and experience.

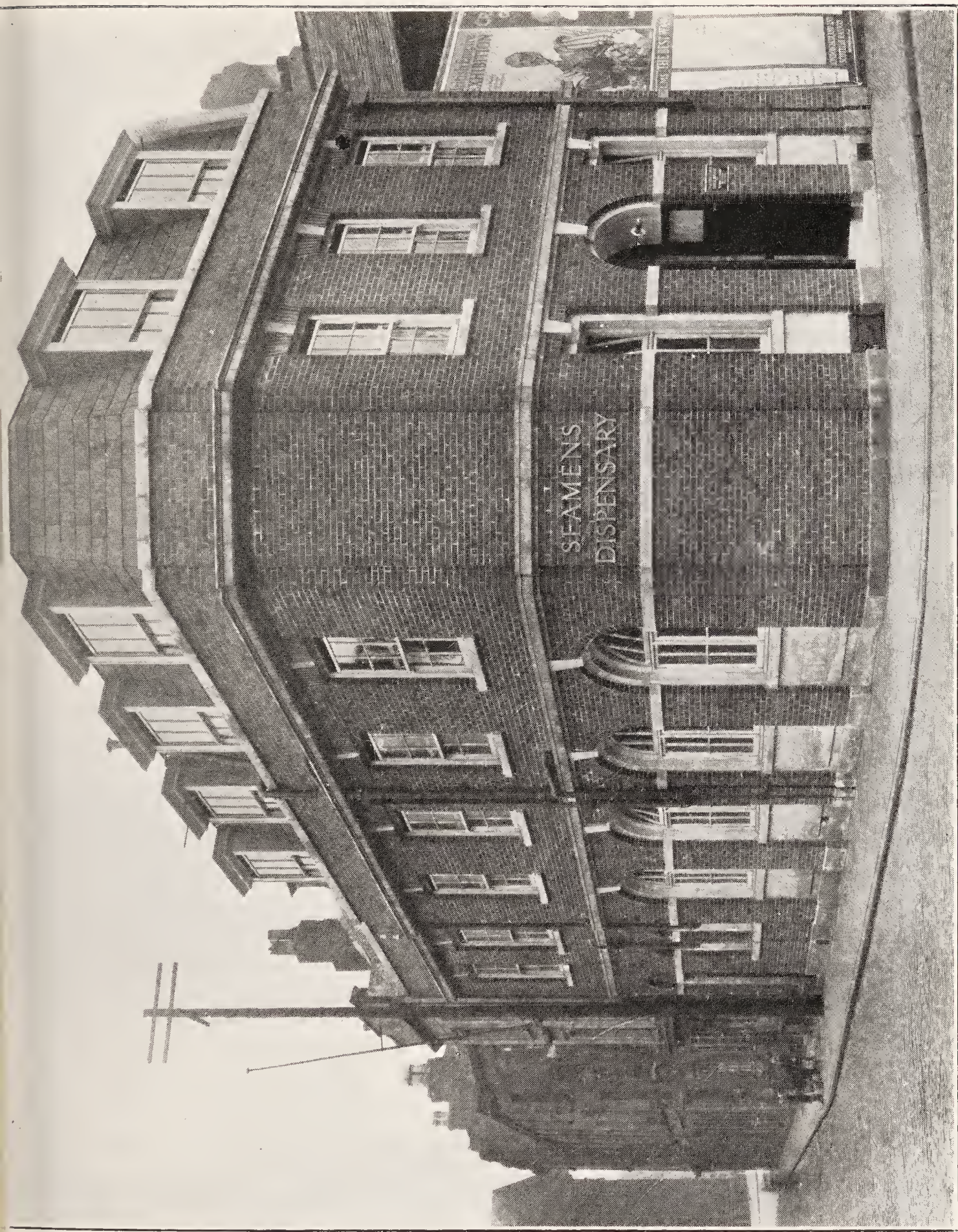
2. A letter is sent to the ship's surgeon, who in many cases will visit the Dispensary and have the patient's treatment explained and will be able to carry on the treatment when at sea.

Ships' surgeons might with advantage refer to the Dispensary all cases treated on board, whether presumed cured or not. They are also cordially invited to visit the Dispensary with regard to treatment of such cases at sea, since many cases cannot be diagnosed at the Dispensary because of treatment given at sea obscuring the symptoms, etc.

Seamen arriving in the port on vessels, and suffering from venereal disease, are reported to the Boarding M.O., who, after examination, directs the patient to one of the clinics in the City, or to the Seamen's Dispensary, but preferably the latter, and the facilities available are explained to him. No difficulties are ever placed in the way by Masters of vessels. Printed cards of advice dealing with their general health, and especially regarding the dangers of venereal disease, are placed in seamen's and other quarters on board ship.

Since the opening of the Dispensary on February 28th, 1924, until the end of the year, there were 471 new cases examined, and the attendances totalled 8,322.



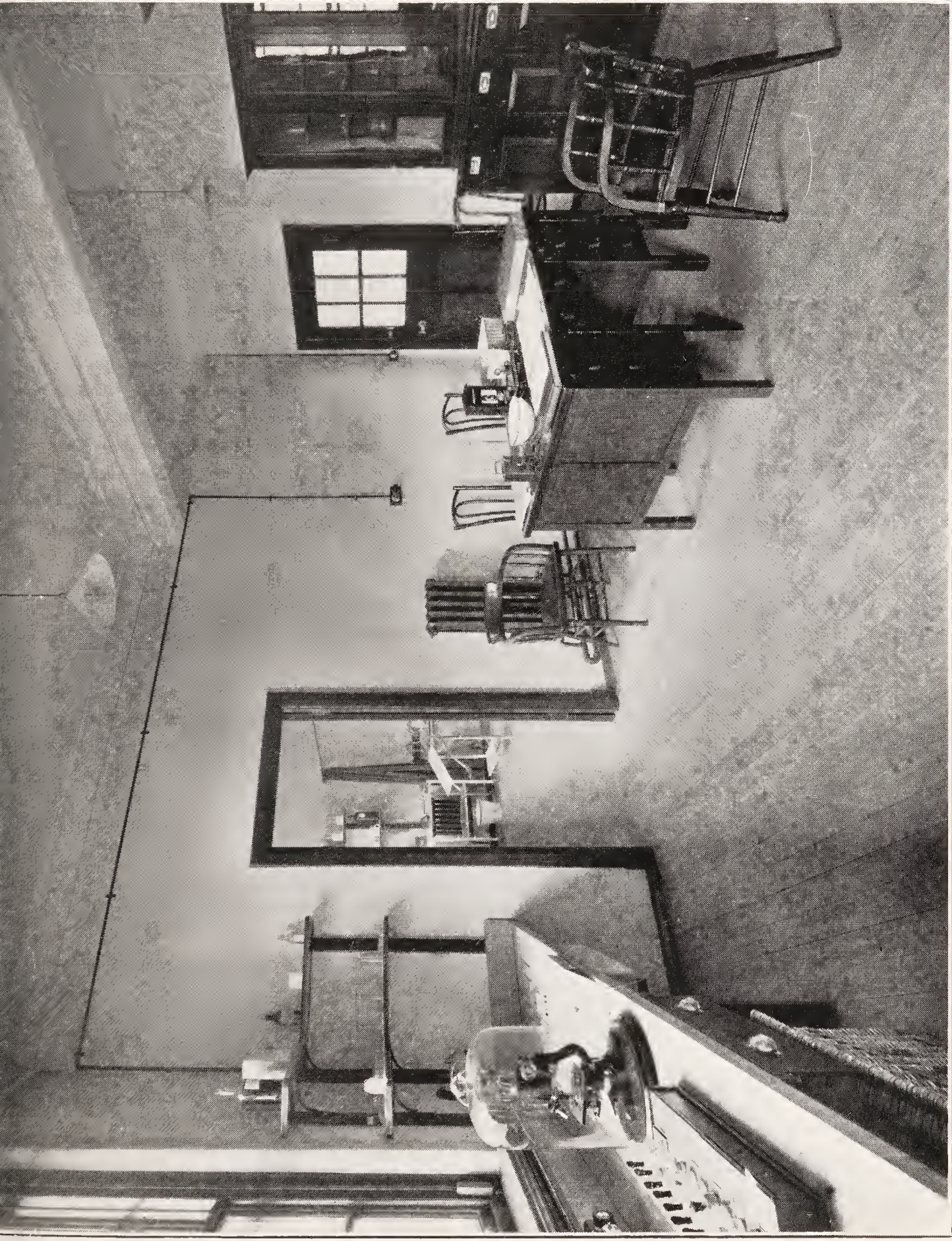


View of the Seamen's Dispensary which was opened on 28th January, 1924, by the Lord Mayor of Liverpool.









Medical Officers' Consulting Room, with facilities for Bacteriological and Microscopical investigation









Operating Room, with modern conveniences for examination and treatment.





The classification of persons dealt with at the Clinic for the first time was as follows :—

Suffering from Syphilis ... ..	85
„ „ Soft Chancre ... ..	25
„ „ Gonorrhœa ... ..	224
„ „ Syphilis and Soft Chancre ...	16
„ „ Syphilis and Gonorrhœa ...	68
„ „ Gonorrhœa and Soft Chancre...	10
Not suffering from Venereal Disease ... ..	43
<b>Total ...</b>	<b>471</b>

The following examinations of pathological material were made :—

For Spirochaetes ... ..	53
„ Gonococci ... ..	461
„ other ... ..	514
„ Wasserman Reaction (at City Laboratory)..	177

It is felt that the Institute will supply a great need in dealing with ailments of the seafaring community. It is the intention to deal primarily with venereal disease at this Centre, but this fact will not debar seamen suffering from other ailments, including tropical diseases, from receiving preliminary advice before being referred to institutions suitable for their complaint.

The accompanying illustrations indicate the appearance of the building and show general views of the treatment rooms, from which it will be seen that they are fully equipped for the purpose required.

## City and Port of Liverpool.

### THE SEAMEN'S DISPENSARY

at the corner of

**CLEVELAND SQUARE & FREDERICK ST.,**

is now open for free examination and  
advice on the ailments of Seamen.

All patients will be medically examined and free treatment given in cases which can be dealt with at the Dispensary. All other cases, after the necessary attention, will be referred to a suitable Hospital for treatment.

**The Dispensary is Open Daily  
from 9-30 a.m. to 8 p.m.**

The hours of attendance of the Medical Officer can be ascertained at the Dispensary.

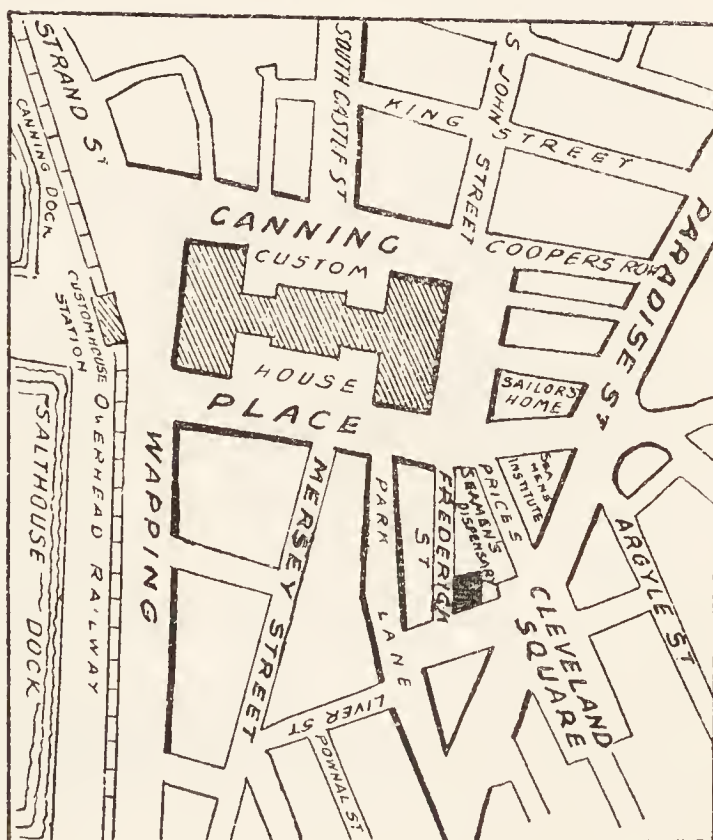




TABLE 7.

## INFECTIOUS DISEASE.

The actual number of cases of Infectious Sickness landed from vessels arriving in the Port of Liverpool during the years 1923 and 1924, and the comparison with the average of the preceding 5 years, is shown in the following table :—

Diseases.	Number of Cases.		Average for the 5 years 1918-1922.
	1923.	1924.	
Smallpox .....	4	1	2·4
Scarlet Fever .....	3	12	14·4
Cerebro-Spinal Meningitis .....	0	0	0·4
Typhus .....	0	0	0·0
Enteric Fever .....	4	11	14·4
Do. (suspected) .....	8	0	3·2
Diphtheria.....	10	3	13·0
Measles and German Measles ..	13	9	22·4
Erysipelas .....	3	2	3·8
Chicken Pox .....	15	8	9·2
Cholera and Choleraic Diarrhœa.	0	0	0·0
Yellow Fever.....	0	0	0·0
Plague .....	0	0	0·0
Suspected Plague .....	0	0	0·8
Phthisis .....	57	58	40·8
Tuberculosis (other forms of).....	6	3	1·8
*Pneumonia and Influenza .....	22	3	32·7
*Malaria.....	20	25	40·2
*Dysentery.....	6	1	4·5
Encephalitis Lethargica .....	2	0	0·0
Totals.....	173	136	204·0

\* Notifiable from 1st March, 1919.

TABLE 8.  
INFECTIOUS DISEASE.

The number of cases of Infectious Sickness reported to have occurred on Liverpool-bound ships during the years 1923 and 1924, and which were disposed of prior to the arrival of the vessel at this port, and the average of such cases for the preceding 5 years, are as follows :—

Diseases.	Number of Cases.		Average for the 5 years 1918-1922.
	1923.	1924.	
Smallpox .....	10	13	11·0
Scarlet Fever .....	3	3	1·2
Cerebro Spinal Meningitis .....	3	0	1·2
Enteric Fever ... ..	10	21	9·6
Typhus .. ..	0	0	0·2
Para-Typhoid .....	3	0	0·2
Diphtheria .....	4	6	3·0
Measles and German Measles ...	32	21	20 2
Erysipelas .....	2	2	0·6
Chicken Pox ... ..	21	19	6·4
Cholera (Suspected) .....	2	1	0·2
*Malaria ... ..	324	314	528·3
Yellow Fever ... ..	0	0	0·0
Plague .....	0	4	0·6
Suspected Plague ... ..	1	0	0·2
Phthisis .....	32	32	8·6
Tuberculosis (other forms of)	12	12	3·4
*Pneumonia and Influenza ...	38	39	27·7
*Dysentery .....	13	16	5·2
Anthrax .....	0	0	0·2
Totals.....	510	503	628·0

\* Notifiable from 1st March, 1919.



The following Table gives particulars of the 345  
had, Infectious Disease on Board, with the measures

TABLE 9.

## SMALLPOX.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Jan. 14	<b>Braunfels</b> ... ..	Basra... ..	1
April 3	<b>Lisbon</b> ... ..	Lisbon and Oporto ...	1
„ 7	<b>Mentor</b> ... ..	Japan ... ..	1
„ 23	<b>California</b> ... ..	Bombay ... ..	2
„ 25	<b>Rius y Taulet</b> ... ..	Valencia ... ..	1
„ 26	<b>City of Genoa</b> ... ..	Bombay ... ..	1
May 30	<b>City of Paris</b> ... ..	Karachi ... ..	1
Oct. 3	<b>Salaga</b> ... ..	West Coast Africa ... ..	6

## P L A G U E .

Jan. 30	<b>City of Calcutta</b> ... ..	Karachi ... ..	1 1
April 22	<b>Crewe Hall</b> ... ..	Rangoon ... ..	1
May 8	<b>City of Harvard</b> ... ..	Bombay ... ..	1

vessels reported on their arrival as having, or having adopted in each case :—

Rating.	How dealt with.
Third Officer ...	Left at Koweit, 7th December, 1923.
Crew ...	Admitted PORT SANITARY HOSPITAL, NEW FERRY.
Stewardess ...	Landed at Colombo.
Watchman and Seaman	Both landed at Marseilles.
Third Engineer ...	Landed at Bristol
Steward ...	Landed at Gibraltar.
Native Fireman ...	Landed at Suez.
Native Passengers	Landed at Monrovia.
Native Fireman ... Native Saloon Boy	Two <b>suspected</b> cases, landed at Suez.
A.B....	<b>Suspected</b> case, landed at Catania.
Fireman ...	Died at Karachi.



## CHOLERA.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
July 8	Clan Macbeth ... ..	Rangoon ... ..	1

## MENINGITIS.

May 1	Cherry Branch ... ..	West Coast America ...	1
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## ENTERIC FEVER.

Jan. 28	Deseado ... ..	Buenos Ayres ... ..	1
„ 28	Darian ... ..	Boston via Manchester ...	1
„ 30	Darian ... ..	Boston via Manchester ...	1
Feb. 11	Western Ocean ... ..	Hampton Roads ... ..	1
„ 11	Desna ... ..	La Plata ... ..	1
„ 26	Ortega ... ..	Valpariso ... ..	2
Mar. 24	Olympia ... ..	Bombay ... ..	1
April 3	Durban Maru ... ..	Yokohama ... ..	1
„ 11	Castalia ... ..	Bombay ... ..	2
„ 28	Appam ... ..	West Coast Africa ... ..	1

Rating.	How dealt with.
Native Fireman ...	<b>Suspected</b> case, landed at Colombo.
Third Engineer ...	Died at Panama.
Passenger ...	Died and buried at sea.
Steward ...	Notified at his address in Wallasey.
Third Officer ...	Removed to FAZAKERLEY HOSPITAL.
A.B....	Removed to FAZAKERLEY HOSPITAL.
A.B....	Removed to FAZAKERLEY HOSPITAL.
Passengers ...	One landed at Punta Arenas, the other proceeded home to Burnley, Lancs.
Passenger ...	Recovered on arrival here.
Cadet ...	Landed at Colombo.
D.B.S. ...	Recovered on arrival here.
Steward ...	Removed to FAZAKERLEY HOSPITAL.



## ENTERIC FEVER.—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
May 12	<b>Laconia</b> ...     ...     ...	World Tour     ...     ...     ...	9
„ 26	<b>Plum Branch</b> ...     ...	Peru     ...     ...     ...	1
June 2	<b>Scythia</b> ...     ...     ...	New York     ...     ...     ...	1
Aug. 3	<b>Canada</b> ...     ...     ...	Montreal     ...     ...     ...	2
„ 27	<b>Bardic</b> ...     ...     ...	Australia     ...     ...     ...	1
Sept. 10	<b>Amalienborg</b> ...     ...	Black Sea Ports     ...     ...	1
Oct. 5	<b>Adriatic</b> ...     ...     ...	New York     ...     ...     ...	1
Dec. 4	<b>Dorelian</b> ...     ...     ...	Galveston     ...     ...     ...	1
„ 17	<b>Abinsi</b> ...     ...     ...	West Coast Africa     ...     ...	1
„ 18	<b>California</b> ...     ...     ...	Bombay     ...     ...     ...	1
„ 19	<b>Scindia</b> ...     ...     ...	Bombay     ...     ...     ...	1

Rating.	How dealt with.
Crew      ...      ...	One suspected case landed Bombay. One died on entering the Mersey. Four removed to FAZAKERLEY HOSPITAL. One reported by M.O.H., Bootle, and Two reported by M.O.H., Seaforth.
Apprentice      ...	Recovered on arrival here.
Passenger      ...      ...	Landed at New York.
Steward and Musician	Steward landed Montreal; Musician removed to FAZAKERLEY HOSPITAL
Fireman      ...      ...	Landed at Durban.
A.B....      ...      ...	Removed to ROYAL INFIRMARY, LIVERPOOL.
Butcher      ...      ...	Removed to NORTHERN HOSPITAL, LIVERPOOL.
Marconi Operator      ...	Removed to FAZAKERLEY HOSPITAL. Sickness proved to be non-infectious.
Steward      ...      ...	Removed to FAZAKERLEY HOSPITAL. Sickness proved to be non-infectious.
Quartermaster      ...	Died in Hospital at Glasgow as per information from M.O.H. of that city.
Native Steward      ...	Landed at Suez.

## SCARLET FEVER.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Feb. 27	<b>Indefatigable</b> ... ..	River Mersey Training Ship	1
Mar. 25	<b>London Corporation</b> ...	Baltimore ... ..	1
April 5	<b>Baltic</b> ... ..	New York ... ..	1
May 10	<b>Indefatigable</b> ... ..	River Mersey Training Ship	1
June 2	<b>Regina</b> ... ..	Montreal ... ..	1
„ 16	<b>Deseado</b> ... ..	Buenos Aires ... ..	1
„ 19	<b>City of Nagpur</b> ... ..	Bombay ... ..	2
„ 30	<b>Scythia</b> ... ..	New York ... ..	1
July 21	<b>Indefatigable</b> ... ..	River Mersey Training Ship	1
Sept. 14	<b>Laconia</b> ... ..	New York ... ..	1
Dec. 1	<b>Doric</b> ... ..	Montreal ... ..	4
„ 23	<b>Montlaurier</b> ... ..	St. John, N.B. ... ..	1



Rating.	How dealt with.	
Cadet      ...      ...	Removed to FAZAKERLEY HOSPITAL, LIVERPOOL.	
Cabin Boy ...      ...	Landed at Philadelphia	
A.B....      ...      ...	Removed to GRAFTON STREET HOSPITAL.	
Cadet      ...      ...	Removed to GRAFTON STREET HOSPITAL.	
Passenger ...      ...	Removed to FAZAKERLEY HOSPITAL.	
Passenger ...      ...	Landed at Lisbon.	
Passenger ...      ...	Removed to FAZAKERLEY HOSPITAL.	
Passenger ...      ...	Removed to NETHERFIELD ROAD HOSPITAL.	
Cadet      ...      ...	Removed to GRAFTON STREET HOSPITAL.	
Passenger ...      ...	Removed to FAZAKERLEY HOSPITAL.	
Passengers ...      ...	Removed to FAZAKERLEY HOSPITAL.	
Passenger ...      ...	Landed at St. John.	

## DIPHTHERIA.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Feb. 5	<b>Persic</b> ... ..	Australia ... ..	2
June 28	<b>Digby</b> ... ..	St. John ... ..	1
July 11	<b>Oroya</b> ... ..	Peru ... ..	1
Oct. 7	<b>Aurania</b> ... ..	New York ... ..	1
Nov. 10	<b>Megantic</b> ... ..	Montreal ... ..	1
„ 25	<b>Elysia</b> ... ..	Bombay ... ..	2
„ 24	<b>Indefatigable</b> ... ..	River Mersey Training Ship	1

## CHICKENPOX.

Jan. 12	<b>Oroya</b> ... ..	Peru ... ..	3
Mar. 27	<b>Chindwin</b> ... ..	Rangoon ... ..	2
„ 31	<b>Oropesa</b> ... ..	Valparaiso ... ..	4
April 23	<b>California</b> ... ..	Bombay ... ..	7

Rating.	How dealt with.	
Passengers ...	...	Landed at Southampton.
Passenger ...	...	Removed to FAZAKERLEY HOSPITAL.
Passenger ...	...	Landed at Vigo.
Cook ...	...	Landed at New York.
Passenger ...	...	Removed to FAZAKERLEY HOSPITAL.
Passengers ...	...	Landed at Marseilles
Cadet ...	...	Removed to FAZAKERLEY HOSPITAL.
Passengers ...	...	Landed at La Pallice.
Firemen ...	...	Landed at Aden.
Passengers ...	...	Three landed at Port Stanley and one at Corrunna.
Passengers ...	...	Suffered during voyage.



**CHICKENPOX.—continued.**

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
May 20	<b>Digby</b> ... ..	Halifax ... ..	1
June 9	<b>Canada</b> ... ..	Montreal ... ..	1
July 4	<b>Montroyal</b> ... ..	Quebec ... ..	1
Aug. 10	<b>Doric</b> ... ..	Montreal ... ..	1
Sept. 19	<b>Montclare</b> ... ..	Montreal ... ..	1
Oct. 20	<b>Demerara</b> ... ..	Buenos Aires ... ..	1
Nov. 4	<b>Aurania</b> ... ..	New York ... ..	1
„ 10	<b>Cedric</b> ... ..	New York ... ..	1
Dec. 5	<b>Montrose</b> ... ..	Quebec ... ..	1
„ 22	<b>Scindia</b> ... ..	Bombay ... ..	2

**DYSENTERY.**

Jan. 25	<b>Kenmore</b> ... ..	Black Sea Ports ... ..	1
„ 29	<b>Crawford Castle</b> ... ..	Mauritius ... ..	1

Rating.	How dealt with.
Passenger ... ..	Removed to FAZAKERLEY HOSPITAL.
Passenger ... ..	Removed to FAZAKERLEY HOSPITAL.
Passenger ... ..	Removed to SPARROW HALL HOSPITAL, LIVERPOOL.
Passenger ... ..	Removed to FAZAKERLEY HOSPITAL.
Passenger ... ..	Proceeded to his home in Sheffield.
Passenger ... ..	Landed at Buenos Aires.
Passenger ... ..	Landed at Queenstown.
Passenger ... ..	Removed to FAZAKERLEY HOSPITAL.
Passenger ... ..	Landed at Quebec.
A.B.'s ... ..	Removed to PORT SANITARY HOSPITAL, NEW FERRY.
Cook ... ..	Landed at Antwerp.
A.B.... ... ..	Landed at Cape Town.

## D Y S E N T E R Y .—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Feb. 19	<b>Pegu</b> ... ..	Rangoon ... ..	1
Mar. 15	<b>Amarapoora</b> ... ..	Rangoon ... ..	1
May 3	<b>Montclare</b> ... ..	St. John, N.B. ... ..	1
„ 12	<b>Laconia</b> ... ..	World Tour ... ..	1
June 3	<b>Orita</b> ... ..	Peru ... ..	1
July 21	<b>Cedric</b> ... ..	New York ... ..	1
Aug. 5	<b>Author</b> ... ..	Calcutta ... ..	1
„ 20	<b>Demodocus</b> ... ..	China... ..	1
Oct. 3	<b>Salaga</b> ... ..	West Coast Africa ... ..	1
„ 20	<b>Memnon</b> ... ..	China... ..	2
Nov. 26	<b>Scientist</b> ... ..	West Indies ... ..	1
Dec. 19	<b>Fabian</b> ... ..	Alexandria ... ..	1
„ 19	<b>Bereby</b> ... ..	West Coast Africa ... ..	1
„ 30	<b>Pegu</b> ... ..	Rangoon ... ..	1



Rating.	How dealt with.
Ship's Surgeon ...	Suffered during voyage.
Saloon Boy ...	Landed at Southampton.
A.B.... ...	Recovered on arrival here.
Passenger ...	Landed at Naples.
Passenger ...	Landed at Corunna.
A.B.... ...	Attended ROYAL INFIRMARY, LIVERPOOL.
Second Engineer ...	Landed at Calcutta.
Cook ...	Landed at Singapore.
Passenger ...	Died at sea
Firemen ...	Landed at Singapore.
A.B.... ...	Landed at Demerara.
A.B.... ...	Suffered during voyage.
Chief Engineer ...	Suffered during voyage.
Stewardess ...	Landed at Rangoon.

## MEASLES.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Jan. 8	<b>Bahrein</b> ... ..	Jaffa ... ..	1
„ 15	<b>Darro...</b> ... ..	Buenos Aires ... ..	2
„ 24	<b>Eurymachus</b> ... ..	Java ... ..	1
„ 28	<b>Deseado</b> ... ..	Buenos Aires ... ..	2
Feb. 2	<b>Montlaurier</b> ... ..	St. John ... ..	1
Mar. 10	<b>Canadian Skirmisher</b> ... ..	San Francisco ... ..	1
April 10	<b>Macharda</b> ... ..	Calcutta ... ..	1
„ 12	<b>Montcalm</b> ... ..	St. John ... ..	1
„ 12	<b>Athenia</b> ... ..	New York ... ..	1
May 3	<b>Hopper No. 19</b> ... ..	Owned by Mersey Docks and Harbour Board	1
„ 9	<b>Carmania</b> ... ..	New York ... ..	1
„ 24	<b>Montrose</b> ... ..	Montreal ... ..	1
June 2	<b>Regina</b> ... ..	Montreal ... ..	2
„ 2	<b>Baltic...</b> ... ..	New York ... ..	1



Rating.	How dealt with.	
Purser ... ..	Observation case, removed to GRAFTON STREET HOSPITAL.	
Emigrants ... ..	Landed at Rio de Janeiro.	
Marconi Operator ...	Suffered during voyage.	
Passengers ... ..	Landed at Rio de Janeiro.	
Passenger ... ..	Removed to FAZAKERLEY HOSPITAL, LIVERPOOL.	
A.B.... ... ..	Suffered during the voyage.	
A.B.... ... ..	Landed at London.	
Passenger ... ..	Recovered on arrival.	
Steward ... ..	Suffered on the outward voyage.	
Deck Hand ... ..	Removed to FAZAKERLEY HOSPITAL.	
Passenger ... ..	Removed to GRAFTON STREET HOSPITAL.	
Passenger ... ..	Removed to FAZAKERLEY HOSPITAL.	
Passengers ... ..	Removed to FAZAKERLEY HOSPITAL.	
Passenger ... ..	Suffered on the voyage.	

## MEASLES.—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
June 9	<b>Montroyal</b> ... ..	Quebec ... ..	1
„ 16	<b>Deseado</b> ... ..	Buenos Aires ... ..	1
„ 19	<b>Samaria</b> ... ..	Boston ... ..	1
„ 22	<b>Megantic</b> ... ..	Montreal ... ..	1
July 7	<b>Celtic</b> ... ..	New York ... ..	1
„ 11	<b>Montcalm</b> ... ..	Montreal ... ..	1
Sept. 6	<b>Orita</b> ... ..	Callao ... ..	3
„ 29	<b>Celtic</b> ... ..	New York ... ..	1
Oct. 24	<b>Oriana</b> ... ..	Valparaiso ... ..	1
Nov. 10	<b>Tello</b> ... ..	Narvick ... ..	1
Dec. 29	<b>Aurania</b> ... ..	New York ... ..	1

## PNEUMONIA.

Jan. 8	<b>Navasota</b> ... ..	La Plata ... ..	1
„ 9	<b>Davisian</b> ... ..	Philadelphia ... ..	1
„ 16	<b>Devonian</b> ... ..	New York ... ..	1

Rating.	How dealt with.
Passenger ... ..	Landed at Quebec
Passenger ... ..	Died and buried at sea.
Passenger ... ..	Landed at Queenstown.
Passenger ... ..	Removed to GRAFTON STREET HOSPITAL.
Passenger ... ..	Observation case, to FAZAKERLEY HOSPITAL.
Passenger ... ..	Recovered on arrival here
Passenger ... ..	Landed at Havana.
Passenger ... ..	Removed to GRAFTON STREET HOSPITAL.
Passenger ... ..	Landed at Valparaiso.
Crew ... ..	Removed to GRAFTON STREET HOSPITAL.
Passenger ... ..	Suffered on the outward voyage.
Trimmer ... ..	Landed at Buenos Aires.
Quartermaster ... ..	Suffered during voyage.
Fireman ... ..	Landed at Boston.



## P N E U M O N I A .—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Jan. 17	<b>Stokesley</b> ... ..	Oslo ... ..	1
„ 28	<b>Deseado</b> ... ..	Buenos Aires ... ..	1
„ 31	<b>Oanfa</b> ... ..	Kobe ... ..	1
Feb. 1	<b>Sea Serpent</b> ... ..	Palermo ... ..	1
Mar. 29	<b>Baltic...</b> ... ..	Alexandria ... ..	1
April 9	<b>Assiout</b> ... ..	Alexandria ... ..	1
„ 14	<b>Athenia</b> ... ..	New York ... ..	1
„ 16	<b>Grodno</b> ... ..	Black Sea ... ..	1
„ 29	<b>Elysia</b> ... ..	Bombay ... ..	1
May 5	<b>Orcoma</b> ... ..	Valparaiso ... ..	1
„ 9	<b>Carmania</b> ... ..	New York ... ..	1
„ 12	<b>Bellerophon</b> ... ..	Singapore ... ..	1
„ 15	<b>Clan Munroe</b> ... ..	Bombay ... ..	1
„ 24	<b>Assyrian</b> ... ..	Italian Ports ... ..	1
„ 27	<b>Scindia</b> ... ..	Bombay ... ..	1
„ 27	<b>City of Madrid</b> ... ..	Bombay ... ..	1
June 5	<b>Darro...</b> ... ..	River Plate ... ..	1

Rating.	How dealt with.	
Steward ... ..	Died and buried at Stornaway.	
Passenger ... ..	Landed at Rio de Janeiro.	
D.B.S. ... ..	Suffered on voyage.	
Boatswain ... ..	Proceeded to Hospital at Palermo.	
Passenger ... ..	Suffered on voyage.	
D.B.S. ... ..	Suffered on voyage.	
Passenger ... ..	Died during voyage.	
Master ... ..	Suffered during voyage.	
Native Fireman ...	Landed Port Sudan.	
Steward ... ..	Suffered during voyage.	
Storekeeper ... ..	Suffered during voyage.	
Passenger ... ..	Died at sea.	
Native A.B. ... ..	Died whilst in London.	
A.B.... ... ..	Died in Venice.	
Second Officer ...	Suffered during voyage.	
Native A.B. ... ..	Landed at Hamburg.	
Passenger ... ..	Died during voyage.	

## P N E U M O N I A .—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
June 10	<b>Celtic</b> ... ..	New York ... ..	1
„ 16	<b>Deseado</b> ... ..	Buenos Aires ... ..	1
July 30	<b>Clan McVicar</b> ... ..	Hamburg ... ..	1
„ 31	<b>Scythia</b> ... ..	Boston ... ..	1
Aug. 2	<b>City of Nagpur</b> ... ..	Bombay ... ..	1
„ 9	<b>City of Batavia</b> ... ..	Bombay ... ..	1
„ 17	<b>Laconia</b> ... ..	New York ... ..	1
„ 26	<b>Suevic</b> ... ..	Australia ... ..	1
Oct. 4	<b>Montcalm</b> ... ..	Montreal ... ..	1
„ 6	<b>Desna</b> ... ..	Buenos Aires ... ..	1
„ 8	<b>Maronian</b> ... ..	Alexandria ... ..	1
„ 10	<b>Ulysses</b> ... ..	Brisbane ... ..	1
„ 14	<b>Nasmyth</b> ... ..	Bahia ... ..	1
„ 16	<b>City of Manchester</b> ... ..	Karachi ... ..	1
„ 24	<b>Oriana</b> ... ..	Valparaiso ... ..	1
„ 27	<b>Henzada</b> ... ..	Rangoon ... ..	1
„ 27	<b>Clan Menzies</b> ... ..	South Africa ... ..	1



Rating.	How dealt with.
Passenger ... ..	Removed to NORTHERN HOSPITAL, LIVERPOOL.
Passenger ... ..	Died and buried at sea.
Lascar ... ..	Landed at Glasgow.
Passenger ... ..	Landed at Queenstown.
Laundryman ... ..	Landed at Glasgow.
Native Cook ... ..	Observation case to MILL ROAD INFIRMARY.
Assistant Cook ... ..	Removed to BROWNLOW HILL INFIRMARY, LIVERPOOL
A.B.... ... ..	Landed at Teneriffe.
Passenger ... ..	Landed at Montreal.
Apprentice ... ..	During voyage. Convalescent on arrival.
Apprentice ... ..	Suffered during voyage.
Fireman ... ..	Landed at Sydney.
Third Engineer ... ..	Died during voyage.
Passenger ... ..	Died during voyage.
Passenger ... ..	Died during voyage.
Passenger ... ..	Landed at Glasgow.
Lascar ... ..	Removed to BIRKENHEAD BOROUGH HOSPITAL.

## PNEUMONIA.—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Nov. 6	<b>Orcoma</b> ... ..	Peru ... ..	1
„ 7	<b>City of Sparta</b> ... ..	South Africa ... ..	1
Dec. 2	<b>Pacific Shipper</b> ... ..	Vancouver ... ..	1
„ 5	<b>Narenta</b> ... ..	San Francisco ... ..	1
„ 15	<b>Desna</b> ... ..	Buenos Aires ... ..	1

## MALARIA.

Jan. 15	<b>Ekari</b> ... ..	West Coast Africa ... ..	1
„ 21	<b>Craftsman</b> ... ..	Calcutta ... ..	1
„ 22	<b>Eboe</b> ... ..	West Coast Africa ... ..	2
„ 25	<b>Sachem</b> ... ..	Boston ... ..	1
„ 31	<b>Salaga</b> ... ..	West Coast Africa ... ..	4
Feb. 6	<b>Elmina</b> ... ..	West Coast Africa ... ..	13
„ 11	<b>Leicestershire</b> ... ..	Rangoon ... ..	2
„ 13	<b>Ekari</b> ... ..	West Coast Africa ... ..	1
„ 15	<b>Biafra</b> ... ..	West Coast Africa ... ..	1
„ 25	<b>Badagry</b> ... ..	West Coast Africa ... ..	1
„ 26	<b>Egba</b> ... ..	West Coast Africa ... ..	11
„ 26	<b>Massillia</b> ... ..	Bombay ... ..	2

Rating.	How dealt with.
Passenger ... ..	Suffered during voyage.
Native Fireman ... ..	Suffered during voyage.
Chief Officer ... ..	Landed at Colon.
Trimmer ... ..	Died during voyage.
Passenger ... ..	Died during voyage.
Third Engineer ... ..	Died at Secondee.
Native ... ..	Suffered on voyage.
Steward and Deck Boy	Suffered on voyage.
Seaman ... ..	Landed at Boston.
Crew ... ..	Suffered on voyage.
Crew ... ..	Suffered on voyage.
Fireman and Greaser	Removed to ROYAL INFIRMARY, LIVERPOOL.
Steward ... ..	Removed to MILL ROAD INFIRMARY, LIVERPOOL.
Deck Boy ... ..	Suffered on voyage.
Third Engineer ... ..	Suffered on voyage.
Passengers and Crew	All well on arrival here.
Native Firemen ... ..	Suffered on Voyage.



## M A L A R I A .—continued.

Date, 1924.	Name of Vessel.				Where from.			No. of Cases.
Mar. 17	<b>Boma...</b>	...	...	...	West Coast Africa	...	...	3
„ 19	<b>Ediba</b>	...	...	...	West Coast Africa	...	...	4
„ 22	<b>Mayumbe</b>	...	...	...	West Coast Africa	...	...	4
„ 28	<b>Bompata</b>	...	...	...	West Coast Africa	...	...	10
April 2	<b>Norwegian</b>	...	...	...	West Indies	...	...	1
„ 7	<b>Fantee</b>	...	...	...	West Coast Africa	...	...	1
„ 12	<b>Montcalm</b>	...	...	...	St. John, N.B.	...	...	1
„ 14	<b>Aba</b>	...	...	...	West Coast Africa	...	...	5
„ 16	<b>City of Sparta</b>	...	...	...	Indian Ports	...	...	1
„ 24	<b>Onitsha</b>	...	...	...	West Coast Africa	...	...	2
„ 26	<b>Ebani...</b>	...	...	...	West Coast Africa	...	...	2
„ 29	<b>Elysia</b>	...	...	...	Bombay	...	...	1
May 5	<b>Hildebrand</b>	...	...	...	Manaos	...	...	1
„ 5	<b>Egori</b>	...	...	...	West Coast Africa	...	...	2
„ 19	<b>Bodnant</b>	...	...	...	West Coast Africa	...	...	1
„ 21	<b>Silva Gonvera</b>	...	...	...	West Coast Africa	...	...	1
„ 22	<b>Bathurst</b>	...	...	...	West Coast Africa	.....	...	6
„ 24	<b>Adda</b>	...	...	...	West Coast Africa	...	...	5
„ 29	<b>Alcinous</b>	...	...	...	Shanghai	...	...	1
„ 30	<b>City of Paris</b>	...	...	...	Karachi	...	...	1

Rating.	How dealt with.	
Crew ... ..	Suffered on voyage.	
Crew ... ..	Suffered on voyage.	
Crew ... ..	Suffered on voyage.	
Crew ... ..	Suffered on voyage.	
Quartermaster ... ..	Suffered on voyage.	
Engineer ... ..	Landed at Sierra Leone.	
Passenger ... ..	Well on arrival.	
Crew ... ..	Suffered on voyage.	
Crew ... ..	Removed to ROYAL INFIRMARY, LIVERPOOL.	
Crew ... ..	Suffered on voyage.	
Crew ... ..	Ill on arrival, but were treated on board.	
Native Fireman ... ..	Suffered on voyage.	
Steward ... ..	Suffered on voyage.	
Crew ... ..	Suffered on voyage.	
Marconi Operator	Died and was buried at sea.	
Captain ... ..	Removed to hospital at Bristol.	
Crew ... ..	Suffered on voyage.	
Crew ... ..	Suffered on voyage.	
Fireman ... ..	Died and was buried at sea.	
Army Officer ... ..	Removed to FAZAKERLEY HOSPITAL, LIVERPOOL.	

## M A L A R I A .—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
June 4	<b>Eurylochos</b> ... ..	Batavia ... ..	1
„ 4	<b>Salaga</b> ... ..	West Coast Africa ... ..	7
„ 5	<b>Catalonia</b> ... ..	West Coast Africa ... ..	5
„ 9	<b>Aba</b> ... ..	West Coast Africa ... ..	1
„ 11	<b>Bonny</b> ... ..	West Coast Africa ... ..	3
„ 13	<b>Massilia</b> ... ..	Bombay ... ..	1
„ 13	<b>Daneholme</b> ... ..	West Coast Africa ... ..	1
„ 13	<b>Briarpark</b> ... ..	San Domingo ... ..	1
„ 17	<b>Ekari</b> ... ..	West Coast Africa ... ..	3
„ 18	<b>Eboe</b> ... ..	West Coast Africa ... ..	2
„ 20	<b>Massilia</b> ... ..	Bombay ... ..	1
„ 24	<b>Egba</b> ... ..	West Coast Africa ... ..	4
„ 24	<b>Appam</b> ... ..	West Coast Africa ... ..	1
„ 26	<b>Castalia</b> ... ..	Bombay ... ..	1
„ 27	<b>Scotia</b> ... ..	Calabar ... ..	1
„ 28	<b>Tsuaren</b> ... ..	Brisbane ... ..	1
„ 30	<b>Hildebrand</b> ... ..	Brazil ... ..	1
July 1	<b>Oropesa</b> ... ..	West Coast America ... ..	2
„ 4	<b>Molesley</b> ... ..	Rosario ... ..	2
„ 4	<b>Liguria</b> ... ..	West Coast Africa ... ..	2



Rating.	How dealt with.
Steward ... ..	Landed at Marseilles.
Crew ... ..	Suffered on voyage.
Crew ... ..	Three well on arrival, two removed to ROYAL INFIRMARY.
Passenger ... ..	Removed to ROYAL INFIRMARY, LIVERPOOL.
Crew ... ..	Suffered on voyage.
Lascar ... ..	Suffered on voyage.
Captain ... ..	Well on arrival here.
A.B.... ... ..	Suffered on voyage.
Crew ... ..	A Cook buried at sea, others well on arrival.
Crew ... ..	Suffered during voyage.
Crew ... ..	Removed to ROYAL SOUTHERN HOSPITAL here.
Crew ... ..	Suffered during voyage.
Cadet ... ..	Suffered during voyage.
Passenger ... ..	Suffered during voyage.
Cook ... ..	Removed to ROYAL SOUTHERN HOSPITAL.
A.B.... ... ..	Suffered during voyage.
Passenger ... ..	Suffered during voyage.
Crew ... ..	Suffered during voyage.
Carpenter and Bosun	Carpenter well on arrival; Bosun attended ROYAL SOUTHERN HOSPITAL, LIVERPOOL.
Crew ... ..	Ill on arrival, but treated on board.

## M A L A R I A .—continued.

Date, 1924.	Name of Vessel.				Where from.			No. of Cases.
July 5	<b>Elmina</b>	...	...	...	West Coast Africa	...	...	1
„ 5	<b>Boma...</b>	...	...	...	West Coast Africa	...	...	6
„ 9	<b>Storfjeld</b>	...	...	...	West Coast Africa	...	...	3
„ 10	<b>Ediba</b>	...	...	...	West Coast Africa	...	...	14
„ 11	<b>Eurymachus</b>	...	...	...	Java	...	...	1
„ 11	<b>Storfjeld</b>	...	...	...	West Coast Africa	...	...	1
„ 14	<b>Clan Chattan</b>	...	...	...	Port Natal	...	...	2
„ 14	<b>Woodville</b>	...	...	...	West Coast Africa	...	...	2
„ 16	<b>Akabo</b>	...	...	...	West Coast Africa	...	...	3
„ 26	<b>Castalia</b>	...	...	...	Bombay	...	...	1
„ 28	<b>Laertes</b>	...	...	...	Amsterdam	...	...	1
Aug. 1	<b>Fordefjord</b>	...	...	...	West Coast Africa	...	...	1
„ 2	<b>Badagry</b>	...	...	...	West Coast Africa	...	...	5
„ 6	<b>Aba</b>	...	...	...	West Coast Africa	...	...	1
„ 13	<b>Zaria</b>	...	...	...	West Coast Africa	...	...	4
„ 16	<b>Elysia</b>	...	...	...	Bombay	...	...	1
„ 16	<b>City of York</b>	...	...	...	China...	...	...	5
„ 17	<b>Cedric</b>	...	...	...	New York	...	...	2
„ 18	<b>Snowdon</b>	...	...	...	Calcutta	...	...	1
„ 18	<b>Appam</b>	...	...	...	West Coast Africa	...	...	1

Rating.	How dealt with.	
A.B....	...	... Suffered during voyage.
Crew	...	... Suffered during voyage.
Crew	...	... All removed to ROYAL INFIRMARY, LIVERPOOL.
Crew	...	... Suffered during voyage.
Steward	...	... Suffered during voyage.
Cook	...	... Admitted to ROYAL INFIRMARY, LIVERPOOL.
Crew	...	... Suffered during voyage.
Crew	...	... Suffered during voyage.
Crew	...	... Suffered during voyage.
Passenger	...	... Suffered during voyage.
Fourth Engineer	...	... Landed at Amsterdam.
A.B....	...	... Suffered during voyage.
Crew	...	... Suffered during voyage.
Marconi Operator		... Suffered during voyage.
Crew	...	... Suffered during voyage.
Lascar	...	... Admitted to ROYAL INFIRMARY, LIVERPOOL.
Crew	...	... Suffered during voyage.
D.B.S.	...	... Suffered during voyage.
A.B....	...	... Landed at Batavia.
Deck Boy	...	... Removed to FAZAKERLEY HOSPITAL, LIVERPOOL.



## M A L A R I A .—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Aug. 19	<b>Ebani...</b> ... ..	West Coast Africa ... ..	3
„ 20	<b>Demodecus</b> ... ..	China... ..	1
„ 23	<b>Hagen</b> ... ..	Batavia ... ..	1
„ 23	<b>Ortega</b> ... ..	Valparaiso ... ..	1
„ 25	<b>Macharda</b> ... ..	Calcutta ... ..	1
„ 26	<b>Egori</b> ... ..	West Coast Africa ... ..	3
Sept. 4	<b>Catalonia</b> ... ..	West Coast Africa ... ..	10
„ 6	<b>Orita</b> ... ..	Callao ... ..	1
„ 8	<b>Vancouver</b> ... ..	Karachi ... ..	1
„ 11	<b>New Brooklyn</b> ... ..	West Coast Africa ... ..	1
„ 12	<b>Scindia</b> ... ..	Bombay ... ..	1
„ 16	<b>Bodnant</b> ... ..	West Coast Africa ... ..	4
„ 16	<b>Stentor</b> ... ..	Yokohama ... ..	2
„ 20	<b>Massilia</b> ... ..	Bombay ... ..	1
„ 26	<b>City of Valencia</b> ... ..	Karachi ... ..	3
Oct. 1	<b>City of Baroda</b> ... ..	Bombay ... ..	3
„ 3	<b>Salaga</b> ... ..	West Coast Africa ... ..	2
„ 13	<b>Abinsi</b> ... ..	West Coast Africa ... ..	1
„ 14	<b>Circassia</b> ... ..	Bombay ... ..	1

Rating.			How dealt with.
Crew	...	...	Suffered during voyage.
Crew	...	...	Suffered during voyage.
Crew	...	...	Suffered during voyage.
Passenger	...	...	Admitted to a NURSING HOME in the City.
Trimmer	...	...	Died during voyage.
Crew	...	...	Suffered during voyage.
Crew	...	...	Suffered during voyage.
Fourth Officer	...	...	Suffered during voyage.
Steward	...	...	Died at Calcutta
Crew	...	...	Suffered during voyage.
Passenger	...	...	Died during voyage.
Crew	...	...	Suffered during voyage
Crew	...	...	Unwell on arrival ; treated on board by Company's Doctor.
Crew	...	...	Suffered during voyage.
Crew	...	...	Suffered during voyage.
Crew	...	...	Suffered during voyage.
Crew	...	...	Suffered during voyage.
A.B....	...	...	Suffered during voyage.
Lascar	...	...	Admitted to ROYAL INFIRMARY, LIVERPOOL.

## M A L A R I A .—continued.

Date, 1924.	Name of Vessel.				Where from.				No. of Cases.
Oct. 15	<b>Plum Branch</b>	...	...	...	Peru	...	...	...	1
„ 18	<b>Discoverer</b>	...	...	...	Cape Town	...	...	...	5
„ 21	<b>Eboe</b>	...	...	...	West Coast Africa	...	...	...	4
„ 27	<b>Olympia</b>	...	...	...	New York	...	...	...	5
„ 28	<b>Ediba</b>	...	...	...	West Coast Africa	...	...	...	6
„ 28	<b>Appam</b>	...	...	...	West Coast Africa	...	...	...	1
„ 30	<b>Bonny</b>	...	...	...	West Coast Africa	...	...	...	3
„ 31	<b>Boma</b>	...	...	...	West Coast Africa	...	...	...	2
Nov. 6	<b>Destro</b>	...	...	...	Smyrna	...	...	...	1
„ 7	<b>Zaria</b>	...	...	...	West Coast Africa	...	...	...	1
„ 10	<b>Castalia</b>	...	...	...	Bombay	...	...	...	27
„ 10	<b>Circassia</b>	...	...	...	Bombay	...	...	...	1
„ 14	<b>Fordefjord</b>	...	...	...	West Coast Africa	...	...	...	1
„ 15	<b>Onitsha</b>	...	...	...	West Coast Africa	...	...	...	1
„ 20	<b>Bata</b>	...	...	...	West Coast Africa	...	...	...	3
„ 25	<b>Elysia</b>	...	...	...	Bombay	...	...	...	3
„ 26	<b>Clematis</b>	...	...	...	West Coast Africa	...	...	...	3
„ 28	<b>Ebani...</b>	...	...	...	West Coast Africa	...	...	...	3
„ 29	<b>Elmina</b>	...	...	...	West Coast Africa	...	...	...	3



Rating.	How dealt with.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Deck Boy and Cadet	Suffered during voyage.
A.B....      ...      ...	Landed at Malta
Quartermaster      ...	Suffered during voyage.
Crew and Passengers	Suffered during voyage.    All well on arrival here.
Native A.B.      ...	Landed at Glasgow.
Native A.B.      ...	Suffered during voyage.
Cook      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Surgeon and Two Natives	Surgeon recovered ; Two Natives removed to ROYAL INFIRMARY.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.
Crew      ...      ...	Suffered during voyage.

## M A L A R I A .—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Dec. 3	<b>Bereby</b> ... ..	West Coast Africa ... ..	1
„ 5	<b>Thomas Holt</b> ... ..	West Coast Africa ... ..	3
„ 8	<b>Abinsi</b> ... ..	West Coast Africa ... ..	7
„ 9	<b>Barracoo</b> ... ..	West Coast Africa ... ..	2
„ 16	<b>Jernfjeld</b> ... ..	West Coast Africa ... ..	4
„ 17	<b>Egori</b> ... ..	West Coast Africa ... ..	4
„ 19	<b>Scindia</b> ... ..	Bombay ... ..	4
„ 20	<b>Bodnant</b> ... ..	West Coast Africa ... ..	7
„ 24	<b>Appam</b> ... ..	West Coast Africa ... ..	2

## P U L M O N A R Y T U B E R C U L O S I S .

Jan. 2	<b>Myrmidon</b> ... ..	Java ... ..	1
„ 7	<b>Appam</b> ... ..	West Coast Africa ... ..	1
„ 22	<b>Montcalm</b> ... ..	St. John, N.B. ... ..	1
„ 23	<b>Steadfast</b> ... ..	Galveston ... ..	1
„ 28	<b>Deseado</b> ... ..	Buenos Aires ... ..	2
„ 28	<b>Cedric</b> ... ..	New York ... ..	1
Feb. 3	<b>Ausonia</b> ... ..	New York ... ..	1
„ 3	<b>Montlaurier</b> ... ..	St. John, N.B. ... ..	1
„ 11	<b>Metagama</b> ... ..	St. John, N.B. ... ..	2
„ 17	<b>Montcalm</b> ... ..	St. John, N.B. ... ..	1

Rating.	How dealt with.	
A.B....     ...     ...	Landed at Seccondée.	
Crew     ...     ...	Suffered during voyage.	
Crew     ...     ...	Suffered during voyage.	
Crew     ...     ...	Suffered during voyage.	
Crew     ...     ...	All landed at Valencia.	
Crew     ...     ...	Suffered during voyage.	
Crew     ...     ...	One Native landed Gibraltar, others well on arrival.	
Crew     ...     ...	Suffered during voyage.	
Cadet and Steward	Suffered during voyage.	
A.B....     ...     ...	Admitted to BROWNLOW HILL INFIRMARY, LIVERPOOL	
Passenger     ...     ...	Landed at Plymouth.	
Steward     ...     ...	Proceeded home to Liverpool.	
A.B....     ...     ...	To Y.M.C.A., Galveston.	
Passengers     ...     ...	Landed at Santos and Vigo.	
Passenger     ...     ...	Landed at Queenstown	
Passenger     ...     ...	Died on board.	
Passenger     ...     ...	Proceeded home to Stoke.	
Passenger     ...     ...	Landed at Glasgow.	
Passenger     ...     ...	Proceeded home to Hastings.	



## PULMONARY TUBERCULOSIS.—continued.

Date, 1924.	Name of Vessel.				Where from.				No. of Cases.
Mar. 3	<b>Marburn</b>	...	...	...	St. John, N.B.	...	...	...	1
„ 6	<b>Dorset</b>	...	...	...	Australia	...	...	...	1
„ 7	<b>Amarna</b>	...	...	...	Alexandria	...	...	...	1
„ 11	<b>Athenia</b>	...	...	...	New York	...	...	...	1
„ 21	<b>Montrose</b>	...	...	...	St. John	...	...	...	1
„ 24	<b>Cedric</b>	...	...	...	New York	...	...	...	1
April 5	<b>Montclare</b>	...	...	...	Montreal	...	...	...	1
„ 7	<b>Deseado</b>	...	...	...	Rio de Janeiro	...	...	...	1
„ 7	<b>Fantee</b>	...	...	...	West Coast Africa	...	...	...	1
„ 8	<b>Megantic</b>	...	...	...	New York	...	...	...	1
„ 10	<b>Macharda</b>	...	...	...	Calcutta	...	...	...	3
„ 12	<b>Montcalm</b>	...	...	...	St. John	...	...	...	1
„ 14	<b>Athenia</b>	...	...	...	New York	...	...	...	1
„ 21	<b>Desna</b>	...	...	...	La Plata	...	...	...	1
„ 28	<b>Cedric</b>	...	...	...	New York	...	...	...	2
„ 28	<b>Appam</b>	...	...	...	West Coast Africa	...	...	...	1
May 5	<b>Orcoma</b>	...	...	...	Valparaiso	...	...	...	2
„ 12	<b>Bellerophon</b>	...	...	...	Singapore	...	...	...	1

Rating.	How dealt with.
Passenger ... ..	Proceeded to Plymouth.
Pantryman ... ..	Landed at London.
Third Engineer ... ..	Proceeded home to Liverpool.
Passenger ... ..	Landed at Queenstown.
Passenger ... ..	Proceeded home to Liverpool.
Passenger ... ..	Proceeded home to St. Helens.
Passenger ... ..	Proceeded home to Maldon.
Passenger ... ..	Proceeded home to Liverpool.
Negro Fireman ... ..	Admitted to BROWNLOW HILL INFIRMARY, LIVERPOOL.
Deport ... ..	Proceeded to Russia.
One Passenger and Two Crew	Passenger died at sea ; Firemen landed at Port Said and Dundee.
Passenger ... ..	Proceeded home to Pontefract.
Passenger ... ..	Proceeded home to Co. Antrim.
Passenger ... ..	Landed at Lisbon.
Passenger ... ..	Proceeded home to Barrow and Sandown, I.O.W.
Carpenter ... ..	Proceeded home to Liverpool.
Passenger and a D.B.S.	Passenger died at sea ; D.B.S. proceeded home to Liverpool.
Cook ... ..	Proceeded home to Liverpool.

## PULMONARY TUBERCULOSIS.—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
May 13	Montreal ... ..	Montreal ... ..	1
„ 24	Montrose ... ..	Montreal ... ..	1
„ 30	Runic ... ..	Australia ... ..	1
June 2	Regina ... ..	Montreal ... ..	1
„ 16	Deseado ... ..	Buenos Aires ... ..	1
„ 21	Montrose ... ..	Montreal ... ..	2
„ 24	Appam ... ..	West Coast Africa ... ..	2
„ 27	Montclare ... ..	Montreal ... ..	1
July 7	Canada ... ..	Montreal ... ..	2
„ 7	Hogarth ... ..	Buenos Aires ... ..	1
„ 11	Oroya ... ..	Peru ... ..	1
„ 15	Samaria ... ..	Boston ... ..	1
„ 18	Montrose ... ..	Montreal ... ..	1
„ 21	Megantic ... ..	Montreal ... ..	1
„ 23	Theseus ... ..	Yokohama ... ..	4
„ 25	Oriana ... ..	Peru ... ..	2
„ 26	Regina ... ..	Montreal ... ..	3
„ 31	Scythia ... ..	Boston ... ..	1



Rating.	How dealt with.
Butcher ... ..	Admitted to FAZAKERLEY HOSPITAL, LIVERPOOL.
Passenger ... ..	Proceeded home to Southport.
Passenger ... ..	Landed at Southampton.
Seaman ... ..	Proceeded home to Bristol.
Carpenter ... ..	Proceeded home to Argyleshire.
Passengers ... ..	Proceeded home to London.
Fourth Officer ... ..	Proceeded home to Wallasey.
Passenger ... ..	Proceeded home to Southport.
Passenger ... ..	Admitted to FAZAKERLEY HOSPITAL.
Cook and D.B.S. ... ..	One proceeded home to King's Cross and one to Seaforth.
Passenger ... ..	Died on board.
D.B.S. ... ..	Proceeded home to Bootle.
Passenger ... ..	Landed at Queenstown.
A.B.... ... ..	Removed to HIGHFIELD SANATORIUM, LIVERPOOL.
Passenger ... ..	Proceeded home to S. Kensington, London.
Military Patients ... ..	Landed at London.
Passengers ... ..	One landed Santander; one proceeded home to London.
Passenger ... ..	Admitted to HIGHFIELD SANATORIUM, LIVERPOOL.
D.B.S. and Steward	Proceeded home to Liverpool
Cook ... ..	Landed at Ellis Island.

## PULMONARY TUBERCULOSIS.—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Aug. 9	<b>Orcoma</b> ... ..	Peru ... ..	1
„ 12	<b>Samaria</b> ... ..	New York ... ..	2
„ 18	<b>Appam</b> ... ..	West Coast Africa ... ..	1
„ 18	<b>Nictheroy</b> ... ..	Buenos Aires ... ..	1
Sept. 1	<b>Celtic</b> ... ..	New York ... ..	1
„ 2	<b>Scythia</b> ... ..	Boston ... ..	1
„ 8	<b>Doric</b> ... ..	Montreal ... ..	1
„ 8	<b>Darro...</b> ... ..	Buenos Aires ... ..	2
„ 13	<b>City of London</b> ... ..	Karachi ... ..	1
„ 29	<b>Celtic</b> ... ..	New York ... ..	1
Oct. 10	<b>Ulysses</b> ... ..	Australia ... ..	3
„ 15	<b>Cedric</b> ... ..	New York ... ..	1
„ 18	<b>Stickelstadt</b> ... ..	Vancouver ... ..	1
„ 20	<b>Indefatigable</b> ... ..	Mersey Training Ship ... ..	1
„ 24	<b>Oriana</b> ... ..	Valparaiso ... ..	1
Nov. 3	<b>Deseado</b> ... ..	Buenos Aires ... ..	1
„ 4	<b>Aurania</b> ... ..	New York ... ..	1
„ 7	<b>Montrose</b> ... ..	Montreal ... ..	1
„ 18	<b>Samaria</b> ... ..	New York ... ..	1

Rating.	How dealt with.	
Passenger ... ..	Landed at Santander.	
Crew ... ..	Both proceeded to their homes in Liverpool.	
Passenger ... ..	Proceeded home to Hull.	
Deck Boy ... ..	Landed at Buenos Aires.	
Steward ... ..	Proceeded home to Birkenhead.	
Passenger ... ..	Landed at Queenstown.	
Labourer ... ..	Proceeded home to Belfast.	
Passengers ... ..	One landed Leixoes, other proceeded to the Continent.	
Native ... ..	To BROWNLOW HILL HOSPITAL, LIVERPOOL.	
Passenger ... ..	Proceeded home to Northumberland.	
Stewardess and Two Stewards	Proceeded home to Birkenhead. Proceeded home to Wallasey and Everton.	
Steward ... ..	Proceeded home to Liverpool.	
A.B.... ... ..	Admitted to FAZAKERLEY HOSPITAL, LIVERPOOL.	
Teacher ... ..	Under treatment on board.	
D.B.S. ... ..	Proceeded to Sailors' Home, Liverpool.	
Engineer ... ..	Proceeded home to Barry.	
Deport ... ..	Landed at Queenstown.	
Deport ... ..	Admitted HIGHFIELD SANATORIUM, LIVERPOOL.	
Machinist ... ..	Admitted HIGHFIELD SANATORIUM, LIVERPOOL.	



## PULMONARY TUBERCULOSIS.—continued.

Date, 1924.	Name of Vessel.	Where from.	No. of Cases.
Dec. 13	<b>Aeneas</b> ... ..	Brisbane ... ..	3
„ 29	<b>Aurania</b> ... ..	New York ... ..	1
„ 30	<b>Oropesa</b> ... ..	West Coast S. America ...	1
„ 30	<b>City of Harvard</b> ... ..	Glasgow ... ..	1

## TUBERCULOSIS (Other Forms).

Jan. 5	<b>Clan Chisholm</b> ... ..	Jaffa via Glasgow ... ..	2
Feb. 28	<b>Malancha</b> ... ..	Glasgow ... ..	1
Mar. 8	<b>Orita</b> ... ..	Peru ... ..	1
„ 20	<b>Romanstar</b> ... ..	South America ... ..	1
May 23	<b>Sea Glory</b> ... ..	Italian Ports ... ..	1
June 19	<b>City of Nagpur</b> ... ..	Bombay ... ..	1
July 29	<b>Lesbian</b> ... ..	Patras ... ..	1
„ 30	<b>Clan McVicar</b> ... ..	Hamburg ... ..	1

Rating.	How dealt with.	
Trimmer and Two Stewards	Trimmer proceeded home to Birkenhead. Stewards landed at Cape Town.	
Passenger ... ..	Proceeded home to Greenock.	
Passenger ... ..	Proceeded home to Liverpool.	
Fireman ... ..	Admitted to hospital in Glasgow.	
.		
Native Fireman and Native Saloon Boy	Remained on board under Surgeon's treatment.	
Native Fireman ... ..	Landed at Glasgow.	
Steward ... ..	Died on board and buried at sea.	
D.B.S. ... ..	Landed at Glasgow.	
Boatswain ... ..	Landed at Gravaso.	
Engineer ... ..	Died on board.	
Steward ... ..	Proceeded home to Isle of Man.	
Lascar ... ..	Admitted to TRANMERE UNION HOSPITAL, BIRKEN- HEAD.	

## TUBERCULOSIS (Other Forms).

Date, 1924.	Name of Vessel.	Where from.	No. of Cases
Aug. 7	<b>Maihar</b> ...     ...     ...	Glasgow     ...     ...     ...	1
„ 22	<b>Montclare</b> ...     ...     ...	Montreal     ...     ...     ...	1
Sept. 8	<b>Dryden</b> ...     ...     ...	Rosario     ...     ...     ...	2
Oct. 25	<b>Denis</b> ...     ...     ...	Ceara     ...     ...     ...	1
Dec. 10	<b>Persic</b> ...     ...     ...	Australia     ...     ...     ...	1

## ERYSIPELAS.

Oct. 20	<b>California</b> ...     ...     ...	East Indies via Glasgow     ...	1
Nov. 7	<b>City of Sparta</b> ...     ...	South Africa     ...     ...	1
Dec. 1	<b>Adriatic</b> ...     ...     ...	New York     ...     ...     ...	2



Rating.	How dealt with.
Fireman    ...    ...	Landed at Glasgow.
Fireman    ...    ...	Admitted to BROWNLOW HILL HOSPITAL, LIVERPOOL.
Seaman and Trimmer	Seaman landed at Buenos Aires ; Trimmer at Santos.
Passenger    ...    ...	Died on board.
Fireman    ...    ...	Landed at London.
Steward    ...    ...	Removed to CITY HOSPITAL, FAZAKERLEY.
Trimmer    ...    ...	One landed at Madeira.
Passengers    ...    ...	One landed at Queenstown, the other removed to FAZAKERLEY HOSPITAL.

### Sanitation of Vessels.

The Port Sanitary Authority has a staff of seven Sanitary Inspectors, who visit the ships lying in the docks as soon as possible after arrival. The Inspector makes detailed enquiries as to any sickness amongst the passengers and crew during the voyage and into all circumstances affecting the health of those on board. He then inspects the sanitary condition of the ship and gives a memorandum to the Master specifying any defects found and requiring their remedy. Other duties of the Sanitary Inspectors are, the disinfection of rooms after the removal of infectious cases, the supervision of fumigations for rat destruction, when the certificate issued by the Port Sanitary Authority is required, or in any case when Hydrocyanic Acid Gas is the fumigant used. The inspection of the sanitary condition of the whole of the Dock area is also undertaken.

The defects to which the Inspectors draw attention are, almost invariably, promptly remedied by the Shipping Company, the Mersey Docks and Harbour Board, or other person concerned.

It will be noticed in the table on page 76 that the defects due to lack of cleanliness are 91·21 per cent. of all the unsatisfactory conditions reported. This is due to the fact that the crews of British ships on arrival in the home-port almost invariably leave their quarters in a very dirty condition. However good the accommodation may be, the health and comfort of the crew is still dependent on the cleanliness of the individual members, and in this respect there is still room for great improvement, a fact which is often quoted as an argument against the provision of further improvements and greater comfort in crew's quarters.

### Canal Boats.

The Port Sanitary Inspectors have been appointed Canal Boat Inspectors under the Canal Boats Acts, 1877 and 1884. This is rendered necessary by the large number of Canal Boats which are to be found lying in the Liverpool Docks. By rotation, one Inspector devotes one whole day per week for a period of five months at a time to this work, as it has been found that in this way it is easier to follow up any boat that may be defective. These boats are for the most part kept in very good repair.

Seven hundred and five boats were inspected during the year, of which 52 were found to have some condition contravening the regulations.

## INSPECTION OF SHIPPING.

Year 1924.

TABLE 10.

Nationality.		Visits.	Re-visits.	Total.
British ...	...	4,175	1,823	5,998
Norwegian	...	178	82	260
Swedish...	...	119	48	167
Spanish...	...	105	53	158
Danish ...	...	92	31	123
Japanese	...	31	16	47
Italian ...	...	13	8	21
Portugese	...	2	1	3
Russian ...	...	15	9	24
French ...	...	65	29	94
Brazilian	...	13	8	21
Dutch ...	...	71	27	98
Greek ...	...	18	15	33
American	...	178	59	237
Belgian	...	7	6	13
German ...	...	88	35	123
Chilian ...	...	1	—	1
Peruvian	...	2	3	5
Finnish ...	...	19	12	31
Esthonian	...	1	—	1
Jugo-Slavian	...	1	1	2
Total ...		5,194	2,266	7,460



## SUMMARY OF INSANITARY CONDITIONS.

TABLE 11.

Class of Vessels.	Number Inspected.	Number on which Nuisances were found.	Per cent.
FOREIGN—			
Steamers ... ..	3,916	616	15·73
Sailing ... ..	5	—	—
Total... ..	3,921	616	15·71
COASTWISE—			
Steamers ... ..	1,216	23	1·89
Sailing ... ..	57	1	1·75
Total... ..	1,273	24	1·88

Nationality.	Number Inspected.	Number on which Nuisances were found.
British ... ..	4,174	594
Foreign ... ..	1,020	46
	5,194	640

## Nuisances arising through

Defects of Original Construction. (a)	Per cent. of Total Defects.	Structural Defects through wear and tear. (b)	Per cent. of Total Defects.	Dirt, and other conditions prejudicial to health. (c)	Per cent. of Total Defects
3	·10	245	8·67	2,575	91·21

TABLE 12.

76a

THE FOLLOWING TABLE SHOWS THE NUMBER AND NATIONALITIES OF THE VESSELS ON WHICH DEFECTS WERE DETECTED DURING THE YEAR 1924.

NATIONALITY.	Number of Ships.	Dirty Forecasts.	Dirty Wash-houses, Store-houses, etc.	Foul Water Casks.	Foul Bilges.	Foul W.C.'s.	Accumulations of offensive refuse.	Gear stowed in Crew's Quarters.	Damp Quarters.	Water lodging on top of forepeak Tank.	Animals kept, causing nuisance	Leaky Decks overhead.	Defective Stoves.	Defective Bulkheads.	Defective Ports and Sky-lights.	Defective Ventilators.	Defective Flooring Boards.	Defective Hatches and Lockers.	Defective Chain Pipes.	Defective Hose Pipes.	Defective W.C. Fittings.	Defective Soil Pipes.	Inadequate Ventilation.	Inadequate Lighting.	Inadequate Drainage.	Bare Iron not Sheathed	W.C.'s deficient in Ventilation and situation bad.	Total number of Defects.	Total Remedied.
British ...	594	2007	82	2	...	372	1	1	4	9	...	60	15	17	68	5	1	1	3	4	36	9	1	...	...	1	1	2700	2596
Norwegian ...	10	11	...	..	...	8	...	...	...	...	...	4	...	...	2	...	...	...	...	...	...	2	...	...	...	...	...	27	27
Swedish ...	3	5	2	...	...	3	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	..	...	10	10
Spanish ...	8	16	...	...	...	1	...	...	...	...	...	...	4	...	7	...	...	...	...	...	...	...	...	...	...	...	...	28	28
Italian ...	4	5	...	...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	8	8
Greek ...	3	3	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	5
Dutch ...	3	3	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	4
American ...	6	2	2	...	...	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	18	16
French ...	4	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	7
German ...	2	2	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	3	3
Portuguese ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	...	...	..	...	...	...	4	4
Russian ...	2	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	5
Total ...	640	2070	86	2	...	401	2	1	4	9	...	65	19	17	81	5	1	1	3	4	38	11	1	...	...	1	1	2823	2713





### Aliens.

Every Alien arriving in this country is carefully interrogated by an Immigration Officer before being permitted to land. It is recognised that the ideal arrangement for medical inspection of Aliens is for the Medical Officer to sit with the Immigration Officer, hear the replies to his questions and thereon decide whether a detailed medical examination is necessary. This is practicable where there are only a few aliens, but on large passenger vessels there are usually a number of Immigration Officers working at the same time in different parts of the ship. Consequently the Medical Inspector must leave the selection of Aliens for medical examination largely to the discretion of the Immigration Officers. The object is to prevent the entrance into this country of Aliens who are :—

- (1) lunatics, idiots or mentally deficient ;
- (2) suffering from any communicable disease ;
- (3) suffering from any disease or deformity which is likely to cause them to become a public charge.

Information of cases of infectious disease is obtained from the ship's surgeon, who may also notify any persons of unsound mind who have required attention during the voyage.

A certain number of aliens are referred for medical examination because their replies to the Immigration Officers appear confused ; a small proportion of these prove to be definitely suffering from mental disorder and are refused leave to land.

The number of persons arriving who are likely to become a public charge is small, because no alien is allowed to enter this country for the purpose of taking up employment here unless he is in possession of a Ministry of Labour permit. The majority of immigrants intending to reside permanently in this country are people of British birth but naturalised Americans, who are returning to their old home in their declining years, or British born women who have lost their husbands in the States and are returning to their parents in this country.

The class of passenger arriving at Liverpool is not such as is likely to provide many aliens who are undesirable on medical or other grounds. The very fact that it is known that alien passengers are carefully

examined on arrival deters those from starting who realise that they might be rejected here. The expense of the voyage, even third class, is considerable, and the type of person likely to be rejected probably cannot pay the fare or, if he can, is not willing to risk being turned back when he arrives here. Circumstances are thus very different from those existing at a port with a regular cross-channel passenger traffic. But for the same reason refusal is a much more serious matter for the passenger, and all the facts must be carefully weighed before a certificate is issued, particularly so when, as often happens, the alien is of British birth, has relations in this country, and frequently still regards himself as British in spite of his American citizenship.

The eastward bound transmigrants are very different from those going from the Continent to America for the first time. They are immigrants who have made good in the States and can afford to visit their native country. They are usually clean and healthy, and do not require to be inspected for verminous conditions or trachoma, as is so necessary in the case of the westward bound transmigrants.

During 1924 medical certificates were issued in respect of 7 aliens; 4 being lunatics, idiots, or mentally deficient; 2 suffering from infectious disease, and 1 being a transmigrant deported from U.S.A. on account of trachoma.

There is another class of alien passenger in regard to whom a medical certificate is not issued, but a verbal report of the result of medical examination is made to the Immigration Officer. These are cases of visitors who are in delicate health or suffering from some chronic ailment, and whose financial resources are rather limited. They have no intention of taking up permanent employment or of residing permanently in this country, consequently it is not necessary to assess their earning capacity. But though a visitor may have ample means to keep him for, say, six months, when in perfect health, his resources may be severely strained by sickness, so that a consideration of his financial position and his health combined may make it advisable to limit his stay in this country to a shorter period, say three months. In some cases the findings of the Medical Inspector, while not justifying rejection for medical reasons alone, may turn the scale against the alien with whom the Immigration Department are not quite satisfied on other grounds.

The number of certificates issued, therefore, does not by any means fully represent the value of the medical inspection of aliens.

During the year 1924 there arrived at Liverpool 20,594 alien passengers. The following table shews how this total is divided amongst the various classes into which incoming aliens are grouped by the Immigration Department of the Home Office.—

Visitors on Holidays, Tourists, etc.	Business Visitors.	In transit to other Countries.	Aliens normally resident in this country and returning after being abroad.	Aliens coming to reside permanently in this country.
14,270	976	1,102	319	906
Aliens holding Ministry of Labour Permits to take up employment in this country.	Diplomats and Persons on Foreign Government Missions.	Seamen under Contract to join Ships in British Waters.	Other Seamen.	Transmigrants.
37	77	27	57	2,823

### Verminous Persons.

Elaborate precautions are taken by the United States Public Health Service to prevent the occurrence of Typhus Fever amongst emigrants from Central Europe to America. Special stations have been erected, through one or other of which all transmigrants must pass. Here, they are medically inspected, freed from vermin, and all their clothing disinfected. All second and third class passengers bound for the U.S.A., whether from the Continent or the British Isles, are inspected by a Medical Officer of the American Public Health Department, immediately before sailing, and if any are found to be in a verminous condition, they are sent to the City Hospitals, Netherfield Road, or Sparrow Hall, where suitable accommodation is available for the destruction of vermin in the clothing and belongings of each person. The cost of the disinfection is defrayed by the shipping company concerned.



### Supervision of Food Importations.

The inspection of imported foodstuffs under the Unsound Food and Foreign Meat Regulations is carried out by a staff of seven qualified Food Inspectors. The procedure is necessarily one of sampling in the first instance, more detailed inspection depending on the conditions of the samples. But by experience the inspectors know when unsatisfactory conditions are likely to be found, and have many sources of information open to them as they go about the docks. Consequently the control over imported foods becomes very complete without the necessity for serious inconvenience and delay to the trade. In April, 1923, the Meat Regulations became operative in regard to imports from the Irish Free State.

Unsound foodstuffs are, whenever possible, allowed to go for industrial purposes. Great care is taken that these foods are not marketed for human consumption, and only well known reliable firms are allowed to receive them for use in the manufacture of poultry foods, dog biscuits, etc., and for melting down for fat extraction purposes.

Where large consignments of food have been found unsound the cause is almost invariably some circumstance, such as faulty refrigeration, &c., arising during the voyage. Large quantities of grain which have been damaged by sweating, sea water, or through fire, and though unfit for human consumption, the damaged wheat has been utilised by poultry food manufacturers.

In consequence of a fire at a flour mill on the Dock Estate, a large quantity (1,997 tons) of fire-damaged wheat was disposed of for animal food under supervision. This work lasted from March until September. A consignment of frozen egg melange marked "uso industrial" was imported from Argentine; this was utilised for poultry food.

In May, as a result of a collision in the River Mersey, nearly a cargo of canned meats and fruit, dried fruit, potatoes, flour, lemons and onions had to be dealt with. The examination was conducted as the goods were

landed on the quays or in warehouse. The canned meats and fruit which were found to be unspoilt were released, the lemons and onions were destroyed, the other foodstuffs which were suitable for the purpose were utilised under supervision for animal food.

In July, 220 cases of lobsters in glass jars were imported, many of these jars had loose tops, other were blown. An examination was made, and resulted in 29 per cent. being found blown. The packer requested the return of the whole parcel; this was refused; a few jars were, however, allowed to be sent to the packers for their inspection, in order to ascertain the cause of the unsound condition. In November, a consignment of 100 cases of Argentine eggs in shell were landed, the parcel being detained for case to case examination. It was found that 56 per cent. of the eggs were unsound.

Towards the end of the year a large consignment of chilled lambs arrived in the Port. The meat when landed was fresh and bright, and is the first consignment landed here in good condition. The condition of meat offal from Madagascar leaves much room for improvement. A large consignment of 2,327 bags of ox livers (10 livers per bag) was landed in November. Owing to the unsatisfactory condition of the livers as regards disease or unsoundness a complete examination is being made.

Imported fresh fruits are now available all the year round, and during the year 1924 over 2,500,000 packages of apples, and 2,250,000 cases of oranges, entered the Port of Liverpool. In addition large quantities of bananas, tomatoes, grape fruit, onions, and potatoes have also been imported. A number of new imports have also arrived; for example, the imports of grape fruit from Florida, California, &c., have been considerable, and it is reported that four times the usual quantity of this fruit has been consumed in this country during the year.

During the early part of the year a dock strike affected the condition of some of the fruit cargoes, e.g., oranges, and greater proportions than usual had to be destroyed. Australian apples arrived in much better

condition this year, and the varieties which were affected with "brown heart" during previous years have not been met with in such large quantities. Australian pears frequently arrived in an unsound condition, and large quantities had to be destroyed.

American apples, as a rule, arrive in good condition, but the cargoes on one or two steamers were in a very bad condition, the greater quantity having to be destroyed. The cause would seem to be due to the long storage of the fruit in stores in America and then being shipped to England in ordinary cargo holds, there being no chill or cold storage on these ships.

Large quantities of Brazil nuts arrived during the year, quite free from the usual mould, frequently found on these nuts.

The following table shews the number and description of samples sent for examination to the City Analyst and City Bacteriologist during the year ended December, 1924 :—

TABLE 13.

CITY ANALYST.					CITY BACTERIOLOGIST.				
CANNED GOODS—					FOOD STUFFS—				
Peas	...	...	...	27	Onions	...	...	...	1
Haricot Beans	...	...	...	4	Oranges	...	...	...	1
Haricot Coupes	...	...	...	2	Lemons	...	...	...	1
Beans (Sliced)	...	...	...	1	Lobster (Glass Jar)	...	...	...	1
Vegetables (Mixed)	...	...	...	3	Cockles	...	...	...	1
Tomatoes	...	...	...	1					
French Spinach	...	...	...	2	Wool	...	...	...	70
Various Fruits	...	...	...	1	Blood Specimens	...	...	...	1
Loganberries	...	...	...	1	Water	...	...	...	5
Black Currant Pulp	...	...	...	1	Rope	...	...	...	1
Rice	...	...	...	1	Wood	...	...	...	1
Plum Pulp	...	...	...	4					
Strawberry Jam	...	...	...	1					
Brine	...	...	...	4					
Flour	...	...	...	1					
Egg Yolk	...	...	...	3					
Water	...	...	...	4					
				<hr/>					<hr/>
Total				61	Total				83
				<hr/>					<hr/>



TABLE 14.

SHOWING THE NUMBERS OF CATTLE, SHEEP, AND SWINE EXPORTED FROM IRELAND TO LIVERPOOL DURING THE YEAR 1924, AND SHOWING THE PORTS IN IRELAND AT WHICH THE ANIMALS WERE SHIPPED.

	Cattle.	Sheep.	Swine.
Ballina ... ..	107	9,236	2,238
Belfast ... ..	2,398	16,202	3
Cork ... ..	36,435	15,774	10,535
Drogheda ... ..	28,179	38,562	1,010
Dublin ... ..	98,986	153,810	29,090
Dundalk ... ..	11,630	44,908	2,251
Galway ... ..	8	641	477
Londonderry ... ..	7,070	18,049	199
Newry ... ..	257	20,664	428
Sligo ... ..	9	11,069	6,924
Waterford ... ..	32,358	29,355	4,996
Limerick ... ..	451	—	205
Total ... ..	217,888	358,270	58,356

TABLE 15.

SHOWING THE TOTAL NUMBERS OF THE SEVERAL KINDS OF CATTLE, SHEEP AND PIGS EXPORTED FROM IRELAND TO LIVERPOOL DURING THE YEAR 1924.

CATTLE.	No.	SHEEP.	No.
Fat ... ..	169,869	Fat ... ..	145,126
Stores (for fattening)	40,462	Stores ... ..	367
Milch Cows ... ..	1,604	Lambs ... ..	212,777
Springers ... ..	844		
Calves ... ..	5,109	Total Sheep ...	358,270
Total Cattle ...	217,888		
		PIGS.	
		Fat ... ..	58,351
		Stores ... ..	5
		Total Swine ...	58,356

TABLE 16.

STATEMENT SHOWING THE NUMBER OF LIVE CATTLE, &c.,  
LANDED AND SLAUGHTERED AT THE FOREIGN ANIMALS  
WHARF (BIRKENHEAD, ALFRED AND WALLASEY  
LAIRAGES) DURING THE YEARS 1905 TO 1924 INCLUSIVE.

Year.	LANDED.				SLAUGHTERED.			
	Oxen.	Calves.	Pigs.	Sheep, Lambs and Goats.	Oxen.	Calves.	Pigs.	Sheep, Lambs and Goats.
1905	276,725	5	—	160,105	276,273	4	—	163,705
1906	270,853	5	—	94,948	270,245	5	—	95,250
1907	214,061	2	—	97,688	215,821	2	—	94,714
1908	180,283	—	—	76,334	179,872	—	—	79,315
1909	148,233	2	—	8,053	147,812	2	—	8,053
1910	89,613	3	—	304	90,430	—	—	304
1911	78,232	2	—	40,338	79,215	1	—	39,314
1912	{ 19,167 143,114	{ — 819	{ — 69,016	{ 14,251 335,291	{ 19,167 140,854	{ — 810	{ — 67,586	{ 14,251 334,880
1913	{ 3,482 351,276	{ — 930	{ — 104,274	{ — 449,344	{ 3,482 90,857	{ — 174	{ — 15,498	{ — 131,241
1914	{ — 333,115	{ — 248	{ — 65,242	{ 1,707 357,528	{ — 171,716	{ — 121	{ — 16,876	{ 1,707 158,562
1915	235,620	—	60,791	288,260	100,560	—	2,353	94,237
1916	270,117	2	84,509	377,753	137,346	—	2,210	134,794
1917	257,781	14	48,013	424,992	127,436	4	655	171,720
1918	178,898	17	28,723	446,039	102,174	—	409	219,915
1919	252,790	977	29,052	362,137	175,302	—	591	241,247
1920	247,015	6,230	31,050	341,350	110,688	9	569	164,669
1921	{ 195,785 49,434	{ — —	{ 19,224 —	{ 325,982 6,706	{ 63,178 49,224	{ — —	{ 2,766 —	{ 165,963 6,706
1922	{ 262,601 38,618	{ 8 1	{ 31,257 —	{ 418,604 —	{ 63,002 38,618	{ 1 1	{ 515 —	{ 153,381 —
1923	{ 166,994 39,690	{ 7 —	{ 77,536 —	{ 194,296 7,003	{ 50,432 37,482	{ — —	{ 4,886 —	{ 90,736 7,003
1924	{ † 217,176 ‡ 417 ‡ 52,193	{ — — —	{ 58,690 888 —	{ 358,310 4,568 4,252	{ 54,572 37 42,324	{ — — —	{ 4,985 3 —	{ 134,207 627 4,252

Heavy type represents Irish.

† Isle of Man.

‡ Foreign.

TABLE 17.

SHOWING THE VALUES OF THE IMPORTS OF MEATS (EXCEPT POULTRY AND GAME) INTO THE PORT OF LIVERPOOL DURING THE YEARS 1916, to 1923.

Description.	Years.							
	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.
Bacon ... ..	£ 15,827,493	£ 18,181,829	£ 36,832,954	£ 38,708,464	£ 21,746,024	£ 13,472,791	£ 8,819,177	£ 8,506,723
Beef, fresh and refrigerated ...	8,880,454	8,297,884	16,470,701	11,916,393	17,754,543	13,430,866	8,016,721	8,561,258
Beef, salted... ..	67,426	86,563	66,238	180,015	—	—	—	—
Hams ... ..	4,114,569	3,983,618	6,843,531	7,404,202	109,461	4,225,544	5,148,303	5,043,264
Mutton, fresh and refrigerated ...	2,751,913	2,116,322	2,128,352	2,219,436	5,702,678	5,842,010	4,262,439	4,879,930
Pork, fresh and refrigerated ...	966,652	469,406	424,056	310,654	1,639,590	920,772	419,018	948,484
Pork, salted ... ..	85,791	56,604	17,544	100,808				
Rabbits ... ..	168,667	180,106	123,468	143,983	342,821	95,873	65,563	77,096
Unenumerated, fresh, refrigerated and salted ... ..	1,101,843	1,214,946	930,022	2,588,273	973,877	678,012	581,442	419,381
Preserved, otherwise than by salting ... ..	3,663,457	6,160,807	9,443,132	13,012,291	2,638,774	1,253,263		
Totals ... ..	£37,628,265	£40,748,085	£73,279,998	£76,584,519	£50,907,768	£39,919,131	£27,312,663	£29,977,731



TABLE 18.

SHOWING THE QUANTITY OF UNSOUND MEATS  
SUPERVISED AND UTILISED  
DURING THE YEARS 1911 TO 1924.

Year.	Beef.				Mutton.				Pork.			
	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.
1911 .....	659	10	2	24	18	7	0	13	6	4	2	20
1912 .....	684	8	3	0	475	12	1	2	9	12	3	18
1913 .....	88	0	3	12	76	16	0	13	1	4	2	15
1914 .....	441	5	2	0	47	5	2	2	1	5	0	2
1915 .....	221	7	0	10	23	14	0	4	2	8	3	21
1916 .....	103	16	0	13	4	10	0	24	1	14	1	16
1917 .....	510	9	3	14	24	11	3	20	0	14	3	16
1918 .....	281	9	0	25	55	15	0	22	4	14	1	4
1919 .....	150	12	3	22	45	18	0	16	—	8	0	8
1920 .....	30	8	2	23	95	8	0	6	—	16	0	16
1921 .....	25	14	2	19	8	13	0	8	1	9	2	22
1922 .....	44	18	1	19	10	9	1	8	2	12	1	18
1923 .....	28	5	3	10	33	9	3	31	—	16	1	9
1924 .....	40	14	1	8	6	17	1	13	1	6	3	13

TABLE 19.

SHOWING THE QUANTITY OF UNSOUND OFFAL  
SUPERVISED AND UTILISED  
DURING THE YEARS 1911 TO 1924.

Year.	Beef.	Mutton.	Pork.	Veal.
1911.....	32,816 pieces.	56,596 pieces.	8,629 pieces.	1,070 pieces.
1912.....	68,272 „	57,163 „	8,229 „	196 „
1913.....	28,055 „	66,705 „	12,946 „	64 „
1914.....	36,561 „	41,298 „	1,919 „	44 „
1915.....	55,219 „	185,551 „	5,644 „	233 „
1916.....	63,900 „	126,110 „	2,765 „	15 „
1917.....	39,466 „	13,212 „	12,460 „	946 „
1918.....	27,216 „	51,755 „	24 „	—
1919.....	103,613 „	61,844 „	76,814 „	19 „
1920.....	207,412 „	358,744 „	261 „	722 „
1921.....	31,695 „	32,989 „	3,699 „	100 „
1922.....	30,794 „	26,991 „	5,129 „	15 „
1923.....	20,309 „	11,401 „	962 „	23 „
1924.....	13,468 „	14,574 „	4,998 „	13 „

TABLE 20.  
SHOWING THE QUANTITY AND DESCRIPTION OF OFFAL CONDEMNED  
DURING THE YEAR 1924.

Name of Organ.	Beef.		Mutton.		Pork.		Veal.	
	Number.	Weight, Pounds.	Number.	Weight, Pounds.	Number.	Weight, Pounds.	Number.	Weight, Pounds.
Livers...	3,589	29,445	296	320	333	1,100	13	86
Tongues	681	3,906	365	107	10	14	—	—
Hearts	1,517	4,467	5,040	1,803	—	—	—	—
Skirts...	713	940	—	—	—	—	—	—
Cheeks	446	944	—	—	—	—	—	—
Kidneys	5,037	4,903	144	24	38	10	—	—
Udders	4	8	—	—	—	—	—	—
Tripe...	321	3,214	—	—	7	14	—	—
Tails	148	304	—	—	—	—	—	—
Feet	1,012	3,618	8,729	4,031	21	42	—	—
Plucks	—	—	—	—	475	2,105	—	—
Heads	—	—	—	—	4,025	30,688	—	—
Lungs...	—	—	—	—	57	459	—	—
Mesenteries	—	—	—	—	2	3	—	—
Intestines...	—	—	—	—	30	83	—	—
Totals	13,468	51,749	14,574	6,285	4,998	34,518	13	86



TABLE 21.

TABLE SHOWING THE QUANTITY AND DESCRIPTION OF UNSOUND MEATS  
SUPERVISED\* DURING THE YEAR 1924.

DESCRIPTION.	TOTAL WEIGHT.		CAUSE OF DESTRUCTION.													
			Tubercular.				Brine Stained, Mouldy and Decomposed.				Other causes. (Emaciation, Dropsy, etc.)					
	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.	Tons	cwts.	qrs.	lbs.				
Beef .....	40	14	1	8	0	7	0	0	40	6	2	5	0	0	3	3
Mutton.....	6	17	1	13	—	—	—	—	6	17	1	13	—	—	—	—
Pork .....	1	6	3	13	—	—	—	—	1	6	0	22	0	0	2	19
Veal .....	0	0	2	24	—	—	—	—	0	0	2	24	—	—	—	—
Total.....	48	19	1	2	0	7	0	0	48	10	3	8	0	0	5	22

\* These were destroyed or allowed to go for industrial purposes to the satisfaction of the Medical Officer.

TABLE 22.

SHOWING QUANTITIES OF UNSOUND GENERAL FOOD-STUFFS SUPERVISED AND UTILISED DURING THE YEAR 1924.

Description.	No. of Tins.	Weight in Pounds	Description.	No. of Tins.	Weight in Pounds.
<b>Canned Goods—</b>			Condensed Milk.	5376	5688
Apples ...	734	5364	Evaporated Milk	11602	11082
Apricots ...	1367	2754	Egg Melange	127	4929
Apricot Pulp ...	1196	12510	Fruit Pulp ...	118	1196
Pears ...	3720	8087	Fruits ...	392	392
Pines ...	34531	57905	Beef ...	15877	94584
Cherries ...	393	841	Mutton ...	1284	7104
Bilberry Pulp	273	2598	Tongues ...	388	375
Raspberries ...	164	328	Pigs' Tongues	281	681
Raspberry Pulp	16	160	Sliced Ham ...	5	15
Black Currant Pulp	417	4278	Lobster ...	467	245
Loganberries ...	1923	3846	Sardines ...	17000	8500
Peaches ...	283	865	Crab ...	1820	912
Plums ...	264	528	Partridges ...	118	147
Pear Pulp ...	138	828	Salmon ...	674	674
Tomatoes ...	42562	112533	Frozen Egg ...	244	10736

Description.	Packages.	Weight.			
Fruit (Fresh)—		Tons.	Cwts.	Qrs.	Lbs.
Apples ...	2977	210	1	0	18
Bananas...	8776	468	5	2	24
,, loose ...	—	6	0	0	0
Oranges ...	836	32	2	0	22
,, loose ...	—	350	0	0	0

TABLE 22—*continued.*

Description.	Packages.	Weight.			
		Tons.	Cwts.	Qrs.	Lbs.
<b>Fruit (Fresh) <i>continued</i>—</b>					
Pears ... ..	506	14	14	3	2
Grape Fruit ... ..	9	—	6	1	20
Lemons ... ..	87	2	17	1	8
Walnuts (shelled) ... ..	3	0	6	0	0
Hazel Nuts (shelled) ... ..	9	1	8	0	0
Grapes ... ..	328	5	16	0	18
Melons ... ..	130	5	17	3	12
„ loose ... ..	—	2	10	0	0
Tomatoes ... ..	314	3	5	2	18
Currants, ... ..	150	2	2	3	12
Apricots... ..	140	1	0	0	16
Walnuts ... ..	8	0	3	2	8
Chestnuts ... ..	487	13	19	2	6
„ loose ... ..	—	0	0	1	0
Onions ... ..	380	16	19	1	4
Potatoes... ..	712	43	2	0	8
Cucumbers ... ..	2	0	0	2	24
Celery ... ..	1	0	0	2	4
Lettuce ... ..	2	0	0	1	2
Asparagus ... ..	1	0	0	1	12
Evaporated Apples ... ..	48	1	1	1	20
„ Peaches ... ..	4	0	1	3	4
„ Apricots ... ..	20	0	8	3	20
Ground Nuts ... ..	314	16	12	0	24
Raisins ... ..	9	0	2	3	8



TABLE 22--*continued*.

Description.	Packages.	Weight.			
		Tons.	Cwts.	Qrs.	Lbs.
<b>Fruit</b> (Fresh) <i>continued</i> —					
Brazil Nuts ... ..	20	0	8	3	20
,, loose ... ..	—	9	0	0	0
Sultanas ... ..	13	0	1	1	10
Pomegranates ... ..	3	0	1	1	20
Prunes ... ..	524	8	1	2	8
<b>Cereals</b> —					
Wheat ... ..	—	3036	12	0	18
Maize ... ..	—	294	15	3	9
Rice ... ..	—	55	18	2	19
,, loose ... ..	—	1	8	3	20
Peas ... ..	—	1	10	2	3
,, loose ... ..	—	3	16	0	24
Flour ... ..	—	73	13	2	20
,, loose ... ..	—	2	12	2	16
Barley ... ..	—	1	5	0	4
Oats ... ..	—	0	6	1	5
,, loose ... ..	—	53	19	0	12
Cornflour ... ..	—	5	0	0	0
,, loose... ..	—	0	9	2	2
Lentils ... ..	—	5	0	0	0
Ground Rice ... ..	—	0	15	0	0
<b>General</b> —					
Hams ... ..	135 (Single)	0	10	1	10
Bacon ... ..	11	2	13	3	15
,, loose ... ..	—	0	0	3	15

TABLE 22—*continued.*

Description.	Packages.	Weight.			
		Tons.	Cwts.	Qrs.	Lbs.
<b>General—<i>continued.</i></b>					
Butter ... ..	—	0	1	2	0
Lard ... ..	1	0	0	1	23
Fruit Pudding ... ..	1	0	0	0	9
Tapioca ... ..	33	2	10	0	0
Lobsters ... ..	906(No)	0	4	0	4
Do. ... ..	702Jars	0	3	0	15
Mackerel ... ..	2	0	1	3	4
Ginger ... ..	6	0	0	3	19
Rabbits ... ..	649	0	10	1	25
Des. Cocoanut ... ..	10	0	15	0	0
Eggs ... ..	93408 (Single)	3	17	2	9

TABLE 23.

SHOWING THE TOTAL QUANTITIES OF THE DIFFERENT  
UN SOUND FOODSTUFFS SUPERVISED DURING THE  
YEAR 1924.

	Tons.	Cwts.	Qrs.	Lbs.
Beef, Mutton, Pork and Veal...	48	19	1	2
Offal (Beef, Mutton, etc.) ...	41	7	0	4
Canned Goods... ..	161	0	1	17
Fruit and Vegetables ... ..	1,217	1	1	2
Cereals ... ..	3,537	3	2	12
General (Fish, Poultry, Rabbits, etc.) ... ..	11	6	3	21
	5,016	18	2	2

TABLE 24.  
Showing comparative Value of the more important Food Stuffs imported at the principal  
Ports during the year 1923.

	London. 1	Liverpool. 2	Hull. 3	Harwich. 4	Bristol. 5	Glasgow. 6	Man- chester. 7	South- ampton. 8	Leith. 9	Newcastle. 10
	£	£	£	£	£	£	£	£	£	£
Animals .....	11,478	3,348,164	—	—	310,596	685,146	345,023	—	—	—
Butter .....	18,058,687	1,841,727	2,876,079	2,586,043	322,074	281,129	223,031	2,189,913	3,366,625	3,817,737
Cheese .....	9,943,187	1,772,941	193,451	200,742	1,040,567	373,478	427,837	207,880	251,388	180,071
Cocoa .....	1,331,319	1,614,368	18,748	202,584	73,428	9,845	—	2,622	77,455	2,321
Coffee .....	1,732,530	40,577	—	—	266,166	—	—	13,561	—	—
Grain.....	22,395,896	18,769,430	12,225,924	61,216	8,380,929	6,255,820	6,518,560	786,095	3,965,155	2,059,987
Eggs .....	6,136,028	2,137,584	998,430	1,428,584	4,937	881,474	179,070	617,900	1,204,181	885,043
Fish .....	2,025,939	2,353,108	505,534	1,152,227	36,063	53,873	49,637	229,003	156,871	308,715
Fruit .....	14,285,985	11,608,192	2,546,722	320,783	2,735,373	2,319,575	1,260,990	2,293,460	300,608	469,213
Lard .....	1,570,291	2,998,990	484,353	19,961	466,960	215,690	956,915	290,243	100,917	552,442
Margarine .....	1,076,964	507,889	1,292,374	823,584	—	183,343	366,222	—	576,031	557,019
MEAT :—										
Bacon .....	3,902,660	8,506,723	2,242,654	13,209,740	607,390	181,364	163,967	1,287,506	278,792	3,685,577
Beef .....	16,148,497	8,561,258	211,155	—	26,255	607,971	171,817	1,171,264	—	482,110
Hams .....	871,966	5,043,264	—	—	270,322	1,490,856	169,207	176,893	—	—
Mutton .....	16,540,094	4,879,930	169,375	237,892	232,133	128,642	69,229	203,472	—	—
Pork .....	1,043,177	948,484	—	179,487	—	—	—	—	—	—
Rabbits .....	444,762	77,096	—	—	—	—	10,436	—	—	—
Unenumerated.....	2,797,642	419,381	344,436	524,467	70,344	328,355	—	108,835	193,567	307,415
Preserved .....		1,541,595	55,438	—	22,276	—	—	—	—	—
Milk, Condensed .....	3,159,166	850,840	803,256	7,504	132,499	15,163	445,724	75,354	198,703	550,247
Poultry and Game .....	779,208	238,186	9,503	76,915	—	—	—	381,660	—	—
Sugar.....	18,890,761	13,134,001	1,408,313	—	1,081,291	935,612	1,120,057	251,379	968,734	764,725
Vegetables .....	2,523,801	1,467,653	1,001,086	335,926	122,004	150,605	234,313	1,652,364	266,014	226,317



## E M I G R A T I O N .

There was a marked decrease in the number of emigrants leaving the Port of Liverpool during the year 1924, the number being 122,201, a decrease compared with the previous year, when the number of emigrants leaving the Port was 159,874.

The following is a return of the number of emigrants and clearances of ships, including those passenger vessels in which medical inspection was not required, from 1901-1924 :—

TABLE 25.

In 1901, 167,452 Emigrants, and 761 Clearances of Ships.		
„ 1902, 214,113	„ 791	„
„ 1903, 265,918	„ 902	„
„ 1904, 274,584	„ 924	„
„ 1905, 277,536	„ 983	„
„ 1906, 352,818	„ 1,090	„
„ 1907, 385,797	„ 1,102	„
„ 1908, 212,155	„ 1,113	„
„ 1909, 253,400	„ 1,117	„
„ 1910, 336,088	„ 1,149	„
„ 1911, 312,027	„ 1,153	„
„ 1912, 323,187	„ 1,165	„
„ 1913, 347,541	„ 1,199	„
„ 1914, 232,954	„ 1,065	„
„ 1915, 75,387	„ 677	„
„ 1916, 58,749	„ 562	„
„ 1917, 18,908	„ 379	„
„ 1918, 13,588	„ 287	„
„ 1919, 120,187	„ 673	„
„ 1920, 204,868	„ 769	„
„ 1921, 161,132	„ 714	„
„ 1922, 120,691	„ 804	„
„ 1923, 159,874	„ 850	„
„ 1924, 122,201	„ 869	„

*The following Tables, Nos. 26 and 27, relating to Emigration have been kindly supplied by the Board of Trade.*

TABLE 26.

Statement showing the number of Passengers (Emigrants and others), distinguishing British subjects and Aliens, who left the Port of Liverpool for places out of Europe in the year 1924 :—

DESTINATION.	British Subjects.	Aliens.	Total.
British North America ...	47,908	18,794	66,702
Australia and New Zealand ...	3,762	105	3,867
British South Africa ...	1,728	28	1,756
India (including Ceylon)...	6,115	325	6,440
Other British Colonies and Possessions ...	5,967	402	6,369
Total British Empire ...	65,480	19,654	85,134
United States ...	14,163	14,883	29,046
Other Foreign Countries	7,050	971	8,021
Total Foreign Countries...	21,213	15,854	37,067
Grand Total ...	86,693	35,508	122,201

TABLE 27.

Number of Passengers (Emigrants and others), distinguishing British subjects and Aliens, as given in Table No. 26, who left the Port of Liverpool in each month of the year 1924 :—

MONTH.	British Subjects.	Aliens.	Total.
January ... ..	3,327	1,737	5,064
February ... ..	3,243	1,324	4,567
March ... ..	7,378	4,025	11,403
April ... ..	8,693	2,737	11,430
May ... ..	7,954	2,646	10,600
June ... ..	5,739	1,876	7,615
July ... ..	6,772	2,846	9,618
August ... ..	11,540	7,822	19,362
September ... ..	10,856	5,388	16,244
October ... ..	10,873	2,466	13,339
November ... ..	6,415	1,577	7,992
December ... ..	3,903	1,064	4,967
<b>Total ... ..</b>	<b>86,693</b>	<b>35,508</b>	<b>122,201</b>



### Emigrant Inspections.

All emigrants travelling second class or steerage on board vessels outward bound are subject to inspection by the Medical Officers of the Board of Trade, Dr. Tinker and Dr. Rentoul. The crews of all such vessels bound for America are also subjected to inspection by these officers. An Inspector of the Port Sanitary Authority attends these clearances in order to supervise the removal of all persons who may be rejected on account of actual or suspected infectious disease.

There were 189 such inspections, and 18 persons were rejected on account of infectious disease.

TABLE 28.

Date 1924.	Name of Vessel.	Nature of Sickness.	Where taken to	Description of Patient.
Feb. 1	Montrose ...	Diphtheria ? ...	Fazakerley Hospital ...	Adult
Mar. 1	Cedric ...	Smallpox ...	New Ferry Hospital ...	Adults (3)
„ 7	Montlaurier ...	Chicken-pox ...	Fazakerley Hospital ...	Child
„ 27	Doric ...	Chicken-pox ...	Returned Home ...	Child
„ 28	Montrose ...	Measles ...	Grafton Street Hospital	Child
May 2	Montrose ...	Smallpox ? ...	New Ferry Hospital ...	Adult
„ 9	Regina ...	Impetigo ...	Boarding House, Duke Street	Infant
„ 16	Montroyal ...	Ringworm ...	Boarding House, Paradise Street	Adult
„ 17	Celtic ...	Ringworm ...	Returned Home ...	Child
„ 23	Montcalm ...	Chicken-pox ? ...	Fazakerley Hospital ...	Children (2)
July 4	Montelare ...	Ringworm ...	Returned Home	Child
Aug. 15	Montcalm ...	Chicken-pox ...	Fazakerley Hospital ...	Child
Oct. 24	Montelare ...	Chicken-pox ...	Hartwell Street, Litherland	Child
Nov. 22	Caronia ...	Whooping Cough	Boarding House, Gt. George Square	Child
Dec. 20	Regina ...	Whooping Cough	Fazakerley Hospital ...	Child

The numbers of Transmigrants notified from other Port Sanitary Authorities, or discovered upon examination in Liverpool to be suffering from "Trachoma" or "Conjunctivitis," from January 1st to December 31st, 1924, were :—

Cases under treatment, 1/1/24	...	...	...	...	2
Cases notified from Hull	...	...	...	...	221
„ „ „ Southampton	...	...	...	...	6
„ „ „ Grimsby	...	...	...	...	1
„ discovered in Liverpool	...	...	...	22	
„ deported from America	...	...	...	2	
				—	24
					254
					=====
Number of above who sailed for U.S.A. and Canada	...				229
„ „ „ were returned home	...	...			15
„ „ diverted to other Ports	...	...			6
„ „ under treatment in Liverpool	...				4
					—
					254
					=====

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The Medical Officer to the Port Sanitary Authority desires to express his appreciation of the valuable assistance received from H.M. Collector of Customs and Staff, the Mersey Docks and Harbour Board and their Officers, and the various Shipping Companies who have co-operated with the Port Sanitary Authority in preventing disease, and have worked harmoniously together in every particular. The Consular Body have at all times given courteous assistance.

E. W. HOPE, M.D.,  
*Late Medical Officer of Health,*  
 AND  
 A. A. MUSSEN, M.D.,  
*Medical Officer of Health.*

MUNICIPAL OFFICES,  
 LIVERPOOL.

1st June, 1925.





**Appendix.**

**REPORT ON THE INVESTIGATION INTO THE  
DESTRUCTION OF VERMIN BY HYDROGEN  
CYANIDE, WITH ESPECIAL REFERENCE TO  
BED BUGS**

BY

R. NEWSTEAD, F.R.S., ALWEN M. EVANS, M.Sc.,  
and W. H. POTTS, B.A.

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This investigation was carried out at the request and at the expense of the Liverpool Port Sanitary Authority.

The work was done with the collaboration of Professor W. H. Roberts, Drs. W. Hanna and C. F. White.

The object of the enquiry was to determine the efficacy of various strengths of Hydrogen Cyanide in the destruction of vermin, especially bed bugs, under natural conditions on board ship.

Preliminary experiments with this gas were conducted in a lethal chamber on the roof of the Public Health Laboratory, the final experiments on board ship.

A summary of the experiments is given on p. 117, and recommendations as to the use of Hydrogen Cyanide on p. 118.

**Haunts of the Bed Bug.**

Certain bug-infested houses and quarters on board ship were inspected for the purpose of ascertaining the various conditions under which these insects live. The conditions observed were, as far as possible, reproduced in the test experiments with the hydrogen cyanide.

Bed bugs, as their name suggests, are to be found chiefly in bedrooms and sleeping quarters, places which will afford them an opportunity of feeding on their host (man) during the night. Being insects which shun light, they withdraw during the day to any retreat which will give them shelter from the light. From these places they come out only at night for the purpose of feeding. The eggs are laid in their day-time haunts,

In houses, the situations favoured by these insects are:—cracks between woodwork fittings and the wall, such as are afforded by brackets or racks nailed or screwed on to the wall; by badly fitting door frames and mantel-pieces; behind pictures, especially underneath the paper backing where this is broken; behind old wall-paper which is peeling off the walls; cracks in plaster; hangings, such as curtains, or mantel-covers; bed-frames, especially in the case of bedsteads with hollow or tubular iron frames.

In ships similar conditions will afford shelter to the bugs, but one or two special ones require attention. Thus the tongue and groove boarding, which so often covers the partitions, or two thicknesses of which form the actual partition, forms a very good refuge, especially when there is a certain amount of air space behind the tongue and groove boarding, into which the bugs can penetrate.

The frame-work of the bunks also seems to be of some importance. In one ship that was investigated, the bunks were put up in sections, and the joints were furnished with collars with slots (see Plate I, fig. 1), in which accumulations of cast skins and living bugs were found. Of greater importance, however, was the fact that the frames of certain types of bunks were hollow tubes with small openings at the ends (fig. 3, B). In the case of the upright stanchions (fig. 3, C), the top end fitted loosely into a socket, whilst the bottom end was let into the deck. The loose fitting socket at the top was of such a nature as to allow the bugs easy access into the tube, whilst the gas, owing to its lightness, would penetrate down the tube only slowly and with difficulty.

A third form of refuge on board was found in a pile of life-jackets observed on one ship. In the folds of the canvas covering of these, bugs were found, and it was thought possible that the insects might penetrate to their interior. Piles of bedding, old clothes, and other such articles might form a similar refuge.

Most of the situations which have been mentioned—crevices in woodwork, cracks in plaster, etc., do not afford the bugs efficient protection against the gas. Three cases, however, required special attention:—(1) match-boarding with a cavity behind, into which the bugs could retreat; (2) tubular iron bunk frames; (3) life-jackets, piles of bedding, old clothes, etc. The first of these cases was investigated by means of a

specially constructed box which will be described below; the second, by means of glass tubes, as will also be described below; and the third, by using similar life-belts.

### Description of Apparatus Used.

*Pill Boxes* (card-board). Those used were about 5 cms. in diameter, and 3.5 cms. in height. They proved to be readily permeable to the Hydrogen Cyanide, and appeared to afford no protection to the bugs.

In the first experiments, in order that some sort of protection from the gas should be afforded, the bugs were placed between two layers of felt in the bottom of the pill box, which was then loosely packed with cotton wool, flannel, paper, etc. This packing appeared to make no difference to the efficacy of the gas.

*Glass Jars* (fig. 1). In many of the experiments the pill boxes were placed inside glass jars of the type used for preserving fruit. These jars had a capacity varying between 930 and 960 c.cs., having a height of about 12 cms. and a diameter of about 10 cms. In ordinary use the grooved metal ring clamps down a flat disc over the top of the jar, thus hermetically sealing it; for the purpose of the experiment, the flat metal disc was replaced by a piece of flannel readily permeable to the gas.

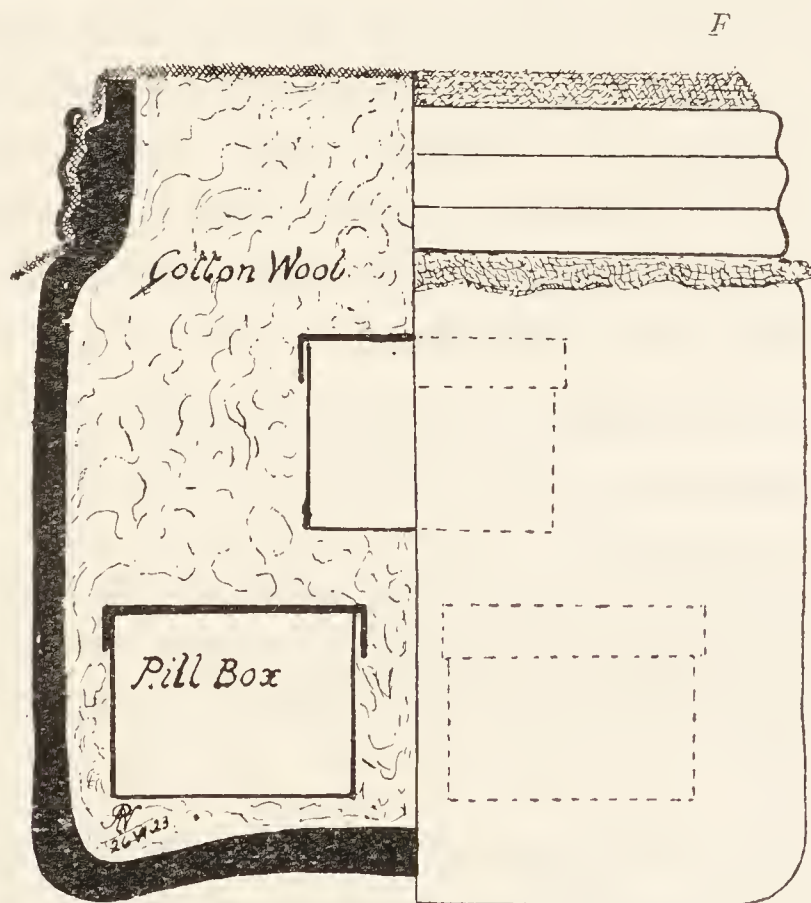


FIG. 1. Section and elevation of the glass jar used in the experiments. *F*.—Flannel covering.



The jars were used in two ways :—

(1) The pill boxes containing the bugs were placed on the bottom of an empty jar, the mouth of which was closed with flannel as described above.

(2) The pill boxes were placed in the middle of cotton wool which filled the jar, as is shown in fig. 1.

*Lethal Chamber.* In the Experiments I-VIII, the exposure to the Hydrogen Cyanide was effected by placing the various pieces of apparatus containing the bugs in a strong wooden chest, referred to as the “Lethal Chamber.” For a description of this and details of the strength of gas and method of generation see the Chemist’s report (p. 118).

The apparatus so far described, was designed for a preliminary test of the efficacy of the gas, and the protection afforded to the bugs in no way closely imitated the protection available to them in their natural haunts on board ship. The pieces of apparatus to be described below were designed especially to imitate certain of the refuges available under natural conditions.

*The Tongue and Groove Board Box* (fig. 2, 2, A). This box was made in order to test as far as possible the protection afforded to insects by the tongue and groove boarding which is used more particularly in ships, either covering portions of the “skin” of the vessel, or forming actual partitions; the grooves afford a certain amount of shelter for the bugs, but of more importance is the possibility of their congregating in the space behind the boarding.

The box was 14 inches long, 10 inches wide, and 12 inches high, having thus a cubic capacity of a little less than 1 cubic foot. One of the sides of the box only consisted of tongue and groove boarding, and on the opposite side of the box was a glass window. In Experiments V and VII the tongue and groove boarding consisted of three pieces placed horizontally, whilst in Experiment VIII it consisted of four pieces placed vertically.

The lid was heavily weighted, so that it fitted down closely on the top of the box, and the grooves formed practically the only means by which the gas could penetrate to the interior of the box.

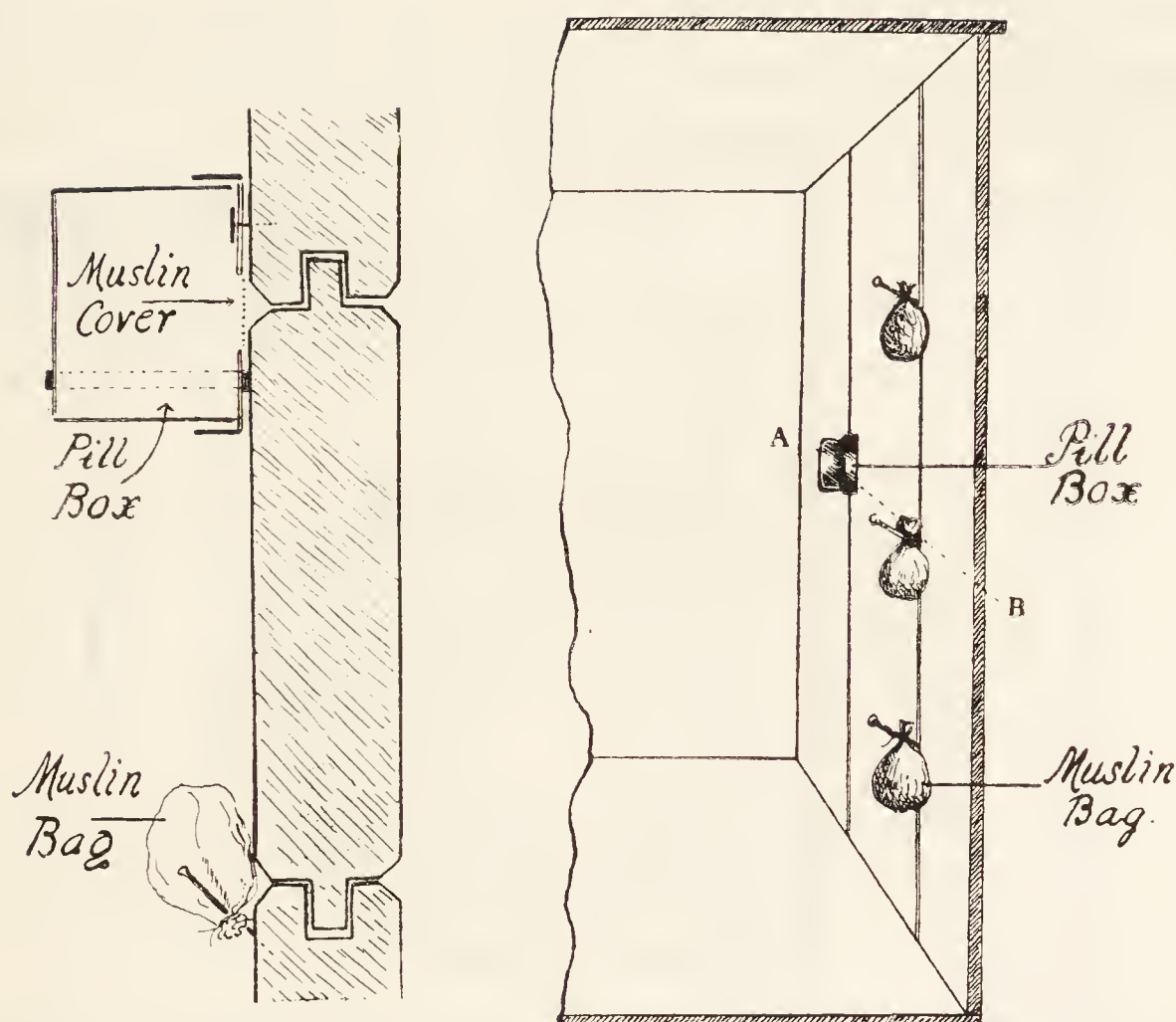


FIG. 2. Tongue and groove board box: section of part of the interior showing the relative positions of the pill box and muslin bags containing bugs. 2A.—section of the tongue and groove boarding (scale  $\frac{1}{2}$ ), showing the positions of the pill box and muslin bag in relation to the joints of the timber.

*The Glass Tubes* (fig. 3). Two glass tubes, I and II, were arranged so as to imitate the conditions found in certain bunks (see fig 3, B). Tube I was roughly 48 cms. long and 4 cms. in diameter, having a volume of about 530 c.cs.; the tube was closed at each end by corks, pierced by two short pieces of glass tubing about 8 mm. in diameter. The corks were sealed with wax, so that gas entered the tube only through the two small pieces of glass tubing. This gave the bugs such shelter as would have been afforded by those bunk tubes with an opening at the ends.

Tube II had a length of about 51 cms., a diameter of about 4 cms., and a volume of about 590 c.cs. The bottom end was closed by a cork covered with wax; on the top end was fitted the lid of a pill box, having a slightly larger diameter than the tube, and raised from it by a small piece of plasticine on each side. There was thus a small inlet for the gas, such as was afforded by the loosely-fitting socket of the upright stanchion of the bunk (fig. 3, c).

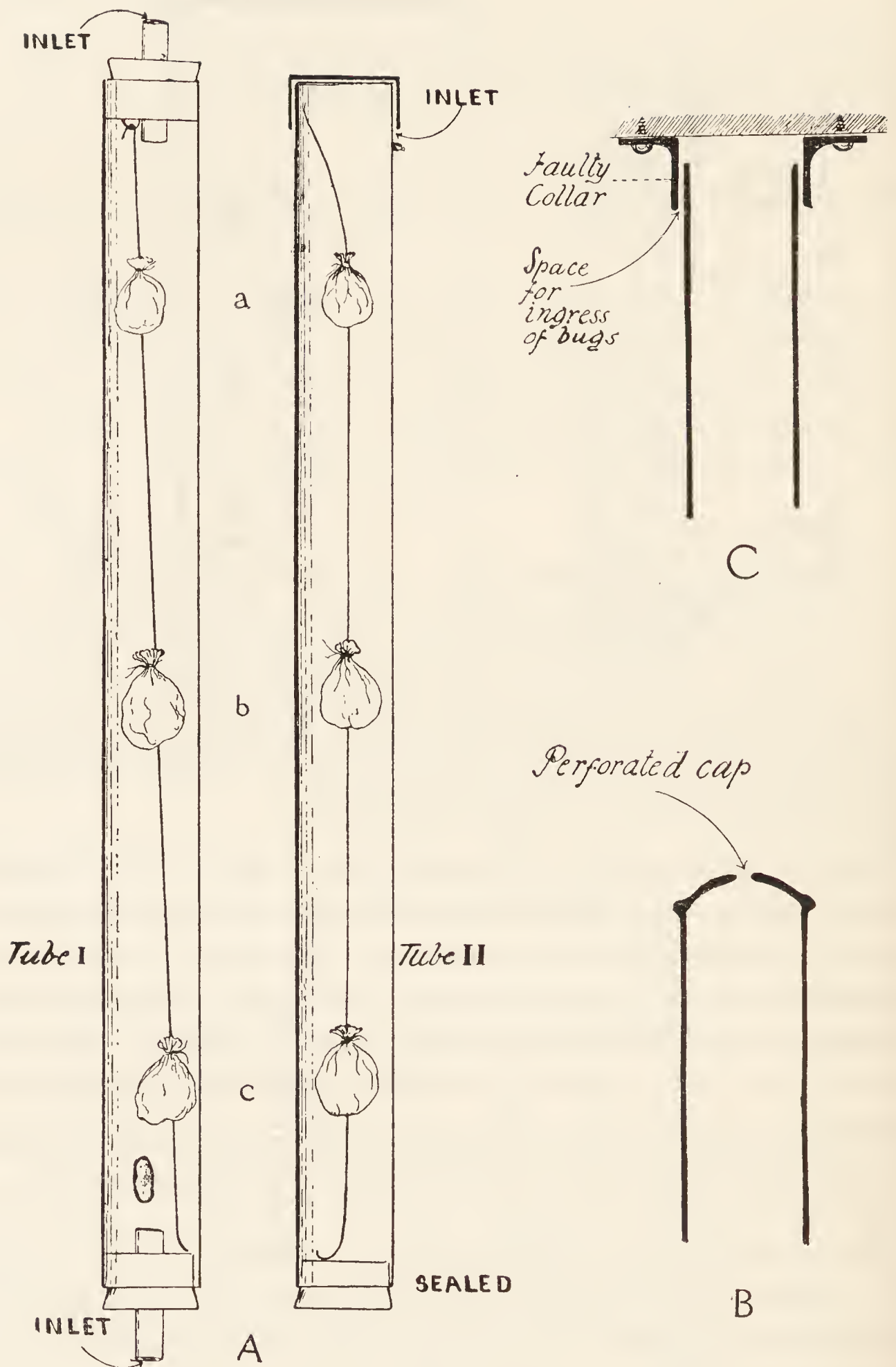


FIG. 3. A.—The glass tubes used in the experiments to test the viability of the bugs and the powers of diffusion of the gas under conditions illustrated in B and C. *a*, *b*, *c*—muslin bags containing bugs. B.—Schematic section of the end of a tubular iron bedstead (faulty type), showing the perforated cap through which the bugs gain access to the tube. C.—Schematic section of the tubular stanchion with loose-fitting (faulty) collar, leaving space for the ingress of bugs.



*Life-Jackets, Bedding, etc.* As a preliminary test of the amount of protection such objects might afford, in Experiment Vc, VIIc, and IXB, a pill box was wrapped in a roll of flannel and cotton wool (a cross section is shown in fig. 4) so that the pill box was protected in all direction by several thicknesses of alternate cotton wool and flannel. This protection being proved to be of no value to the bugs, sterner tests were carried out.

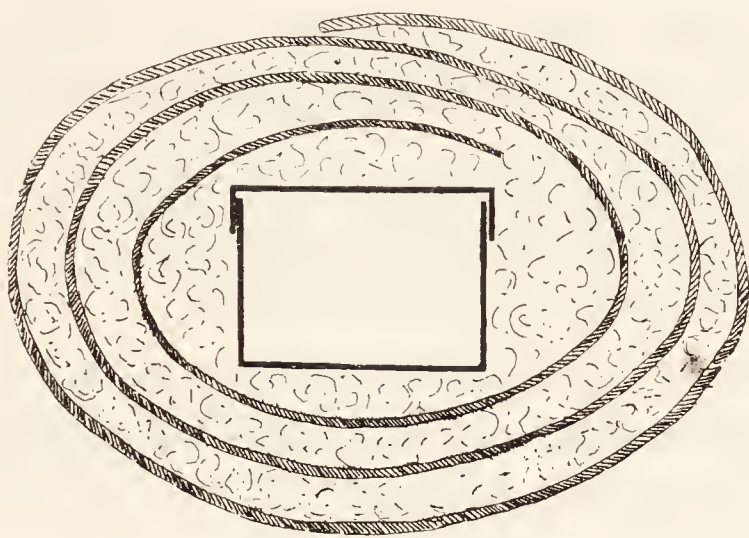


FIG. 4. Schematic section of the roll of cotton wool and flannel showing the position of the pill box containing bugs.

In Experiment VIIF, a life-jacket (Plate I, fig. 2), 2 ft. 8½ in. long, 10½ in. wide, and 3 in. in height was used. This life-jacket was stuffed with tightly-packed Kapok (a vegetable product resembling raw cotton). The pill box was placed inside the middle portion (Plate I, fig. 2x), and the end portion tied firmly over the middle portion, the resultant being a compact roll, 10 in. by 10½ in. Even this failed to prevent a fatal concentration of gas reaching the bugs.

In Experiment IXK, a third test was carried out, the pill box being inserted in the interior of a straw-stuffed mattress. This, too, failed to protect the bugs against the gas.

### Laboratory Methods of Dealing with Bugs.

In the Laboratory the bugs were kept between layers of dark-green baize in glass jars 3½ in. by 2 in., or tubes 3 in. by 1 in., covered with a layer of cotton voile, and the jars and tubes placed in an incubator at a mean temperature of 25° C. At intervals of about a week the bugs were given an opportunity of feeding on the shaved abdomen of a rabbit. The voile-covered jars were applied to the host's skin, and the bugs had no

difficulty in feeding to repletion in this way. We are indebted to Dr. J. W. Scott Macfie for conducting these operations. In addition many batches of larval bugs were fed on the investigators.

Great care had to be taken in deciding whether bugs which had been exposed to the action of the gas had been permanently affected or not. It was found that after the experiments, bugs could be divided roughly into four categories according to their condition :—

(1) Bugs motionless and apparently dead immediately after the experiment, and never recovering their powers of movement.

(2) Bugs motionless immediately after the experiment, after the lapse of 24 hours regaining imperfectly their powers of movement, but after this becoming feebler daily and finally dying.

(3) Bugs motionless immediately after the experiment, but after about 24 hours completely regaining their powers of locomotion, after which they continue to live in a normal way.

(4) Bugs which are quite active and apparently healthy immediately after the experiment and remain so.

There was no doubt that bugs belonging to categories 1 and 2 were killed by the gas, but it was less easy to decide whether those in 3 and 4 had not suffered some permanent injury which would result in their ultimate destruction. The surviving bugs of categories 3 and 4 were, therefore, kept under observation for several days and tested to see whether they were able to feed, and produce fertile eggs, before they were considered to have recovered completely from the effects of the gas. Several batches of eggs obtained from the survivors were allowed to hatch and the larvæ which emerged were quite healthy and fed readily when placed upon a host. It was abundantly evident from these observations that the bugs were in no way injured by the gas and would have been quite capable of continuing the infestation of either houses or ships.

At the beginning of the investigation controls were used for both adults and eggs of *C. lectularius*. These were put into receptacles similar to those containing the experimental specimens and taken to the place where the experiment was conducted, remaining near the lethal chamber till the close of the experiment. This was done in order to test

the effect of the sudden lowering of temperature upon the bugs. As the control bugs remained entirely unaffected, we considered it unnecessary to use them for the adults and nymphs in later experiments, the stock lot of bugs serving for comparison with the survivors during the period of observation. In the case of eggs, however, control eggs laid on the same day were kept under observation to insure that there was no defect inherent in the eggs to prevent their hatching.

#### EXPERIMENT I. 7.6.23.

##### *Material used in the experiment.*

Bed bugs (*Cimex lectularius*).

*A* and *C*. 12 bugs in each. *Controls* : for *A* and *C*. 12 bugs.

*B* and *D*. 12 eggs in each. *Controls* : for *B* and *D*. 13 eggs.

##### *Conditions.*

*General.* The material was exposed for two hours to a concentration of Hydrogen Cyanide of about 0.3 per cent.

*Details.* *A* and *B*. The specimens were placed between two layers of green felt in chip-boxes, and the latter filled loosely with flannel. The boxes were placed in a glass jar, covered with flannel.

*C* and *D*. The specimens were placed between two layers of green felt in chip boxes and the latter packed with cotton wool. The boxes were placed in a glass jar which was also packed with cotton wool and covered with flannel.

##### *Results.*

*A*, *B*, *C*, and *D*. Both bugs and eggs were all killed in each case.

*Controls.* Bugs. All were alive on the next day and had laid seven eggs during the night after the experiment. Eggs. 10 out of 13 (77 per cent.) hatched between 10th and 12th June.

#### EXPERIMENT II. 8.6.23.

##### *Material used in this experiment.*

Bed bugs (*Cimex lectularius*).

*A*. 12 eggs. *Controls* : 12 eggs (laid same day).

*B*. 6 bugs. *Controls* : 6 bugs.

*C*. 9 eggs. *Controls* : 9 eggs (laid same day).



*Conditions.*

*General.* The material was exposed for one hour to a concentration of Hydrogen Cyanide of about 0·3 per cent.

*Details. A.* The specimens were placed between layers of green felt in a chip box, and the latter loosely filled with flannel, and placed in an empty jar.

*B and C.* The specimens were placed between layers of green felt in a chip box, the latter packed with cotton wool, and placed in a jar also packed with cotton wool.

*Results.*

*A.* All the eggs were killed.

*Controls.* All hatched.

*B.* Of the 6 bugs, 3 survived.

*Controls.* All were quite normal on the morning after experiment.

*C.* All the eggs were killed.

*Controls.* 5 out of 9 (55 per cent.) hatched.

## EXPERIMENT III.

Head louse (*Pediculus capitis*).

*A.* Adults and eggs. *Controls:* eggs.

Body louse (*Pediculus corporis*).

*B.* Adults.

*Conditions.*

*General.* The material was exposed for two hours to a concentration of Hydrogen Cyanide of about 0·3 per cent.

*Details.* The specimens were placed in chip boxes in petri-dishes and the dishes filled up with tightly-packed cotton wool and covered with one layer of flannel.

*Results.*

The eggs and adults were all killed by the experiments.

*Controls.* The eggs hatched normally.

## EXPERIMENT IV. 13.6.23.

*Materials used in this experiment.*

Bed bugs (*Cimex lectularis*).

A. 30 bugs. Controls: 6 bugs.

B. 6 bugs. Control: 4 bugs.

C. 45 eggs. Controls: 12 eggs.

D. 11 eggs. Controls: 10 eggs.

Head lice (*Pediculus capitis*).

E. Eggs. Controls: eggs.

Body lice (*Pediculus corporis*).

F. Adults. Controls: adults.

*Conditions.*

*General.* The material was exposed for three hours to a concentration of Hydrogen Cyanide of about 0.2 per cent.

*Details.* A and C. The specimens were placed between two layers of baize in chip boxes and the boxes filled up tightly with cotton wool; the boxes were placed in jars and the jars packed with cotton wool and covered with a layer of flannel (see fig. 1).

B and D. The specimens were placed between two layers of baize in chip boxes and the boxes filled up with flannel and then placed in otherwise empty jars covered with flannel.

E. The eggs attached to the hairs on which they had been laid, were placed in glass-bottomed pasteboard boxes with tight-fitting pasteboard lids.

F. The lice were among the folds of a garment which was rolled up and placed in a glass jar covered with flannel.

*Results.*

A. 10 out of 30 bugs were killed.

B. 2 out of 6 bugs were killed.

C. 12 out of 45 eggs hatched (i.e., 27 per cent.).

Controls: 8 out of 12 matched (i.e., 67 per cent.).

D. 6 out of 11 eggs hatched (i.e., 54 per cent.).

Controls: 7 out of 10 hatched (i.e., 70 per cent.).

E. All the eggs hatched.

F. None of the adults was killed.

## EXPERIMENT V. 19.6.23.

*Materials used in this experiment.*

Bed bugs (*Cimex lectularius*).

A. 20 bugs. *Controls*: 12 bugs.

B. 48 eggs. *Controls*: 29 eggs.

C. 20 bugs. *Controls*: those used for A.

D. 20 bugs. *Controls*: those used for A.

Black Rats.

E. 3 living rats from ship.

*Conditions.*

*General.* The material was exposed for three hours to a concentration of Hydrogen Cyanide of about 0.2 per cent.

*Details.* A and B. The specimens were placed between folds of green baize, in a chip box with two holes in the lid, over which had been pasted voile. The box was then pinned inside the tongue and groove boarding box (fig. 2, A), so that the two holes in the lid of the former were lying opposite the groove between the tongue and groove boarding of the latter.

C. The specimens were placed between folds of baize in a chip box, and the latter wrapped up in cotton and flannel (see fig. 4), forming a roll of about 4 inches in diameter, in the centre of which was the chip box.

D. The specimens were placed in a chip box between folds of baize. The lid of the chip box was perforated with small holes, and the chip box placed on the floor of the lethal chamber.

E. The rats were placed in a small cage on the floor of the lethal chamber.

*Results.*

A. Bugs. The whole number (20) recovered by the next morning.

B. Eggs. 37 out of the 48 (77 per cent.) hatched.

*Controls.* Of the 29 eggs, 28 hatched.

C. Bugs. 19 of the 20 completely recovered by the next morning.

D. Bugs. All were killed.

A, C, and D. *Controls.* Bugs. All 12 quite normal on the next morning.



*E.* The three rats were stiff when taken out of the lethal chamber. From them were collected the following:—9 ♂♂ and 4 ♀♀ of the plague flea (*Xenopsylla cheopis*), all of which were dead.

#### EXPERIMENT VI. 22.6.23.

##### *Material used in this experiment.*

*A.* 15 rats from a warehouse “black rats.”

*B.* One rat's nest.

*C.* 10 larvæ of the rat flea (*Ceratophyllus fasciatus*).

##### *Conditions.*

*General.* The material was placed in the lethal chamber for three hours and the concentration used was about 0.2 per cent. of Hydrogen Cyanide.

*Details.* *A.* The 15 rats were placed in lethal chamber in a stout unbleached calico bag.

*B.* The rat's nest was wrapped in paper, which was pierced with slits.

*C.* 10 larvæ of *Ceratophyllus fasciatus* were placed in a tube, the mouth of which was closed by cotton wool, in the rat's nest.

##### *Results.*

*A.* The 15 rats were quite dead, and from them were collected:—3 ♂♂ and 5 ♀♀ of *Ceratophyllus fasciatus*, also dead.

*B.* From the rat's nest we obtained:—One adult *Ceratophyllus fasciatus*, dead, and two larvæ, dead.

*C.* Of the 10 larvæ in the tube, all were dead when examined on the 22nd and 23rd of June, whilst control larvæ were still alive.

#### EXPERIMENT VII. 25.6.23.

##### *Material used in this experiment.*

Bed bugs (*Cimex lectularius*).

*A.* 20 bugs.

*B.* 50 eggs. *Controls:* 60 eggs (laid same day).

*C.* 20 bugs.

*D.* 10 eggs.

*E.* Tube I. (*a*), (*b*) and (*c*), 10 bugs. (*b1*), 25 eggs.

Tube II. (*a*), (*b*) and (*c*), 10 bugs. (*b1*), 25 eggs.

*Control:* for *D* and *E*, 23 eggs.

*F.* 20 bugs.

*Conditions.*

*General.* The material was exposed for two hours to a concentration of Hydrogen Cyanide of about 0.3 per cent.

*Details. A and B.* The specimens were placed between layers of green baize in a chip box, which was put inside the tongue and groove board chest as in Experiment VA.

*C and D.* As in Experiment Vc.

*E.* The specimens were placed in muslin bags, (a), (b), (b1) and (c), and these suspended, (a) at the top, (b) and (b1) in the middle, and (c) at the bottom, of two glass tubes, I and II (see fig. 3, A and description of apparatus, p. 95).

*F.* The specimens were placed in a chip box in the usual manner, and the chip box placed inside a life-belt (see Plate I, fig. 2, and description of apparatus, p. 97).

*Results.*

*A.* Bugs. 14 out of 20 (70 per cent.) survived.

*B.* Eggs. 42 out of 50 (84 per cent.) hatched.

*Controls.* 47 out of 60 (78 per cent.) hatched.

*C.* Bugs. All were killed.

*D.* Eggs. All were killed. *Controls.* All except 2 hatched.

*E.* Tube I. Bugs. (a), (b), and (c). All were killed in each case.  
Eggs. (b1). All were killed.

Tube II. Bugs. (a) All (10 out of 10) were killed.  
(b) 9 out of 10 were killed.  
(c) 1 out of 10 was killed.

Eggs. (b1) 17 out of 25 (68 per cent.) hatched.

*Control.* Eggs. All hatched except 2 (91 per cent.).

*F.* Bugs. All were killed.

## EXPERIMENT VIII. 13.6.23.

*Material used in this experiment.*

Bed bugs (*Cimex lectularius*).

*A, B, (a), (b), (c); C (a), (b), (c).* 10 bugs in each.

*B (b1) and C (b1),* 20 eggs in each. *Controls.* 8 eggs (laid on same day).

*Conditions.*

*General.* The material was exposed for three hours to a concentration of Hydrogen Cyanide, of about 0·3 per cent.

*Details.* *A.* The specimens were placed in an open voile bag in a chip box as used in Experiment VA, and the box placed under the same condition as in that experiment.

*B.* The specimens were placed in voile bags (*a*), (*b*), (*b*<sup>1</sup>) and (*c*), in a glass tube (see fig. 3, A), (*a*) and (*c*) being at each end and (*b*) and (*b*<sup>1</sup>) in the middle. The tube was supported horizontally in the lethal chamber in such a position that bag (*a*) was nearest to the point of evolution of the gas.

*C.* The specimens were placed in voile bags (*a*), (*b*), (*b*<sup>1</sup>) and (*c*), which were pinned against the groove on the inside of the matchboarding box (see fig. 2), (*a*) being at the top, (*b*) and (*b*<sup>1</sup>) in the middle and (*c*) at the bottom.

*Results.*

*A.* 4 out of the 10 bugs were killed.

*B.* (*a*), (*b*), (*c*). All were killed.

*B.* (*b*<sup>1</sup>). None of the eggs hatched. *Controls*: all hatched.

*C.* (*a*) and (*b*). 5 out of 10 bugs were killed in each case.

*C.* (*c*). 9 out of 10 bugs were killed.

*C.* (*b*<sup>1</sup>). 12 out of 20 eggs hatched. *Controls*: all hatched.

**Experiments on Board Ship.**

EXPERIMENT IX. 20.7.23. *Fumigation of the s.s. "Lady Emerald."*

*Material used in this experiment.*

*A-K.* Ten voile bags, each containing 10 bugs, were used.

*L and M.* Two cages of rats, containing 4 and 3 respectively.

*Conditions.*

*General.* The material was exposed for two hours to a concentration of Hydrogen Cyanide produced by 8 oz. of Sodium Cyanide per 1,000 cubic feet (i.e., about 0·3 per cent. Hydrogen Cyanide). The gas was generated in tubs, in the usual manner, in the two places fumigated (the seamen's and the firemen's quarters); the position of these tubs in relation to the dispositions of the material may be seen quite readily from figs. 5 and 6.



There were no traces of bugs in the ship, but the food-lockers were very much infested with mice.

*Details* (see figs. 5 and 6). *A-K*. The voile bags containing the bugs were, for convenience, placed in chip boxes, and these were disposed as follows:—

*In the Seamen's quarters* (see fig. 5).

*A*, *B* and *C* were placed, in the match-boarding box used in previous experiments, on a bench, raised about two feet off the floor.

*D* was placed in a roll of cotton wool and flannel (as used in Experiment Vc.) on the floor beneath the bench mentioned above.

*I* was placed near to it, to serve as a control.

*E* was placed in the food-locker, about four feet from the ground.

*F* was placed on the table in the mess-room.

*G* was placed on a beam just under the roof.

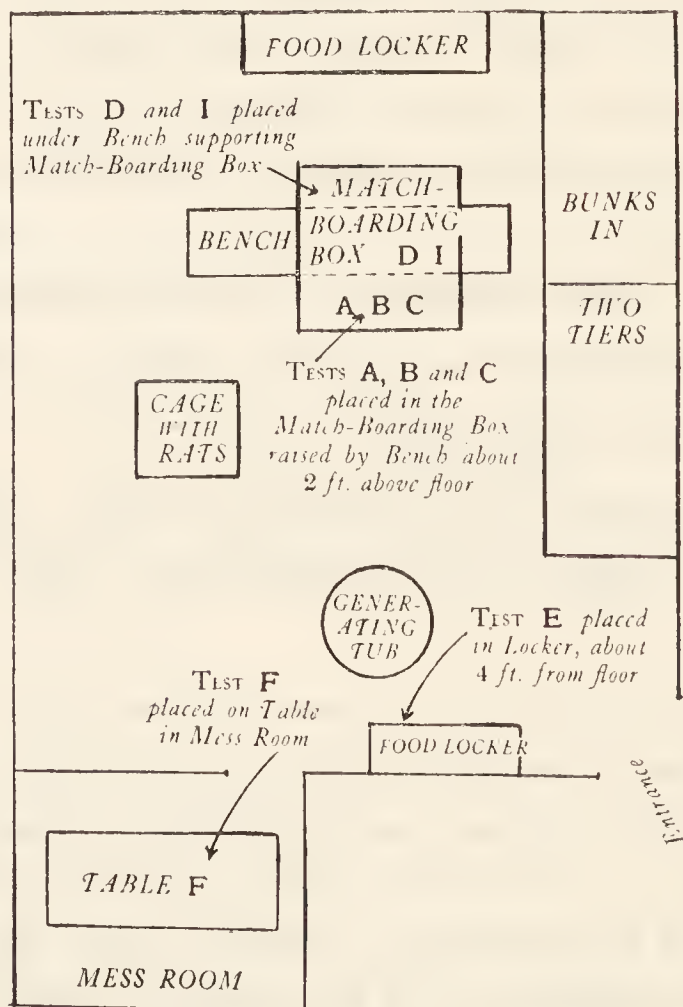


FIG. 5. Schematic plan showing the relative positions of the tests placed in the Seamen's quarters, Experiment IX.

*In the Firemen's quarters (see fig. 6).*

*H* was placed in a situation similar to that of *G*.

*K* was placed in the straw stuffing of a mattress lying on the bottom bunk on the left-hand side.

*L* and *M*, the two cages of rats, were placed, one on the floor of the seamen's quarters (see fig. 5), and the other on a bench, raised about  $1\frac{1}{2}$  feet above the ground in the firemen's quarters (see fig. 6).

#### Results.

*A*. All the bugs survived except one.

*B*. All the bugs survived except two, though this lot showed a quicker rate of mortality, subsequently, than did either *A* or *C*.

*C*. All the bugs survived.

*D*. All the bugs were killed.

*E*. 3 bugs only out of the 10 survived.

*F*. 1 bug only (a 3rd stage larva) survived.

*G*, *H*, *I*, and *K*. All the bugs were killed.

*L* and *M*. All the rats (7) were killed, and from them were taken 2 specimens of *Ceratophyllus fasciatus* (♀ ♀) and a number of lice, also dead.

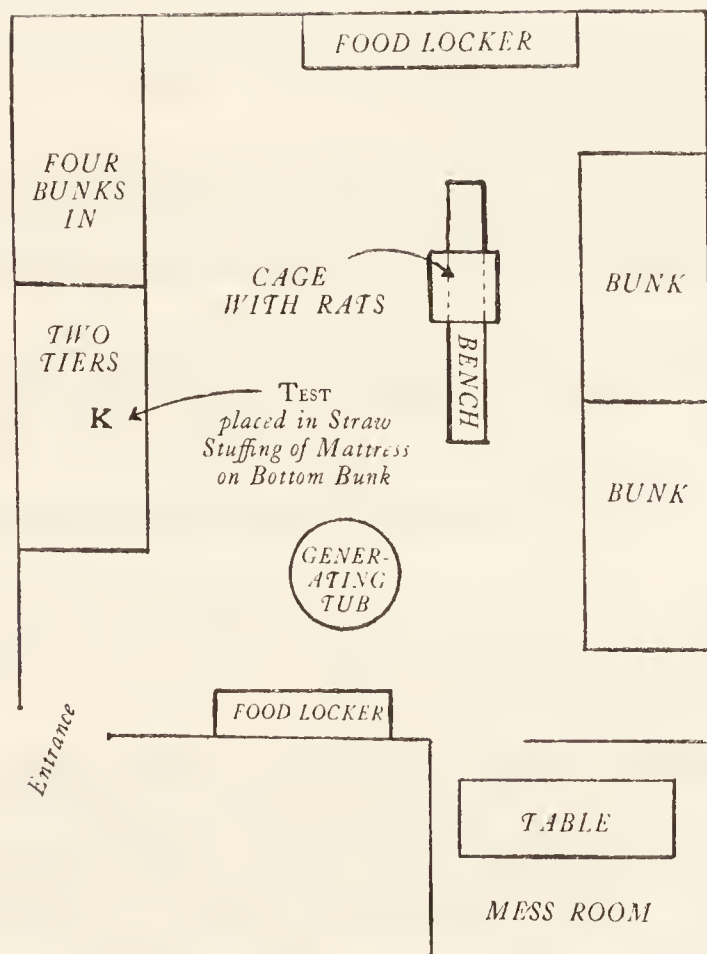


FIG. 6. Schematic plan showing the relative positions of the tests placed in the Seamen's quarters, Experiment IX.

EXPERIMENT X. 23.2.24. *Fumigation of the s.s. "Montcalm."**Material used.*

Bed bugs (*Cimex lectularius*).

A, C and D. 10 bugs.

B. 14 bugs.

*Conditions.*

*General.* The passenger accommodation only was fumigated. The fumigation was effected by spraying liquid Hydrogen Cyanide,  $2\frac{1}{2}$  oz. per 1,000 cubic feet, giving an average concentration of about 0.27 per cent. HCN. The duration of exposure was from 3-3 $\frac{1}{2}$  hours.

*Details.* The bugs were placed in chip boxes loosely packed with pieces of green felt.

A. The chip box was placed behind the skirting-board of a cabin in the stewards' quarters, amidships. The skirting-board was open underneath, and had a couple of large circular holes, the one directly in front of the chip box being closed by means of a pillow.

B. This chip box was used as a control for A, being placed on a table in the cabin, to test the concentration of the gas outside the skirting-board.

C. The chip box was placed in a cupboard in a cabin in the passengers' starboard quarters.

D. This was used as a test of the concentration of the gas outside the cupboard in which C was, being placed on a table in the same cabin.

*Results.*

A, B, C, and D. All the bugs were killed in each case.

EXPERIMENT XI. 13.3.24. *Fumigation of the s.s. "City of Paris."**Material used.*

Bed bugs (*Cimex lectularis*). A-G. 7 lots of 10 bugs.

*Conditions.*

*General.* As in the last experiment, fumigation was effected by spraying liquid Hydrogen Cyanide, the concentration produced being about 0.2 per cent. The fumigation lasted for 3-3 $\frac{1}{2}$  hours.

*Details.* The bugs were placed in chip boxes with a little green felt and newspaper packing.



*A* and *B*. The two chip boxes were placed in the rudder post locker, in the firemen's fo'castle. This structure was formed by tongue and groove boarding, about one and a quarter inches thick, with a closely-fitting door, which was closed. The capacity was about 50 cubic feet. The temperature in the fo'castle was fairly high.

*C* and *D*. These two chip boxes were placed on chests in the firemen's fo'castle, near the rudder post locker. They served as tests of the concentration of gas outside the locker.

*E*. This chip box was placed in the space under the chest of drawers, in a passenger cabin on the port side of the bridge deck. As this structure was built into the side of the cabin, the only way the gas could penetrate into the space was by means of the crack between the bottom drawer and the framework of the chest of drawers.

*F*. This chip box was placed in the bottom drawer of the above-mentioned chest of drawers.

*G*. This chip box was placed on the shelf of a toilet apparatus in the same cabin as *C*. It formed a test of the concentration of the gas in the air outside the chest of drawers.

#### *Results.*

*A*. 1 bug only survived out of 10.

*B*. 3 out of the 10 survived in a healthy condition.

*C* and *D*. All the bugs were killed.

*E*. All the bugs were killed.

*F*. 2 bugs survived in a healthy condition.

*G*. All the bugs were killed.

#### **Discussion of Results and Tables.**

In all the experiments, the action of the gas was not considered to be satisfactory unless every bug was killed. This attitude was adopted because one bug, if it happened to be a fertilised female, would be quite capable of starting a fresh infection.

TABLE I.

Summary of experiments on Bed Bug (*Cimex lectularius*).

Experiments I-IV.

No. of experiment.	Conditions of experiment.			Experimental material.		Control material.	
	Average concentration of gas.	Length of exposure.	Conditions.	Number of specimens.	Percentage killed.	Number of specimens.	Percentage died.
IA ...	% 0.3	2 hours	In pill boxes in empty glass jar, unprotected.	12 bugs	% 100	...	% ...
IB ...	0.3	2 hours	In pill boxes in empty glass jar, unprotected.	12 eggs	100	13 eggs	3
Ic ...	0.3	2 hours	In pill boxes in glass jar, protected by cotton wool	12 bugs	100	...	...
ID ...	0.3	2 hours	In pill boxes in glass jar, protected by cotton wool.	12 eggs	100	13 eggs (as used for IB)	3
IIA ...	0.3	1 hour	In pill boxes in empty glass jar, unprotected.	12 eggs	100	12 eggs	0
IIB ...	0.3	1 hour	In pill boxes in glass jar, protected by cotton wool.	6 bugs	50	...	...
IIC ...	0.3	1 hour	In pill boxes in glass jar, protected by cotton wool	9 eggs	100	9 eggs	45
IVA ...	0.2	3 hours	In pill boxes in glass jar, protected by cotton wool.	30 bugs	33	...	...
IVB ...	0.2	3 hours	In pill boxes in empty jar, unprotected.	6 bugs	33	...	...
IVc ...	0.2	3 hours	In pill boxes in glass jar, protected by cotton wool	45 eggs	73	12 eggs	33
IVD ...	0.2	3 hours	In pill boxes in empty jar, unprotected.	11 eggs	46	10 eggs	30

Table I summarises the results obtained in the preliminary experiments where the only protection afforded to the bugs was that of the cotton wool in which they were packed. A concentration of 0·3 per cent. of gas, acting for two hours, was sufficient to kill both bugs and eggs, whether protected or not (Experiment I). It did not, in one hour, kill bugs when protected by cotton wool (Experiment II). A concentration of 0·2 per cent. of gas, even though allowed to act for three hours, failed to kill either bugs or eggs whether protected or not (Experiment IV).

In the following table, which for convenience has been divided into three sections, are seen the results obtained in the lethal chamber, when forms of protection resembling more nearly those of their natural conditions were afforded to the bugs.

TABLE II.  
Summary of the Experiments on Bed Bugs (*Cimex lectularius*).  
Section A., Experiment V.

No. of experiment.	Conditions of experiment.			Experimental material.		Control material.	
	Average concentration of gas.	Length of exposure.	Conditions.	Number of specimens.	Percentage killed.	Number of specimens.	Percentage died.
A ...	% 0·2	3 hours	Pill box pinned inside tongue and groove board box.	20 bugs	% 0	...	% ...
B ...	0·2	3 hours	Pill box pinned inside tongue and groove board box.	48 eggs	23	29 eggs	3
C ...	0·2	3 hours	Pill box inside cotton wool and flannel roll.	20 bugs	5	...	...
D ...	0·2	3 hours	Pill box with perforated lid on floor of lethal chamber.	20 bugs	100	...	...

From this section it will be seen that a concentration of 0·2 per cent., acting for three hours, failed to kill bugs protected by tongue and groove boarding, or by the flannel and cotton wool roll; it succeeded, however, in killing them completely when they were exposed without any means of protection (Experiment V).



TABLE II—*Continued.*

## Section B, Experiment VII.

No. of experiment.	Conditions of experiments.			Experimental material.		Control material.	
	Average concentration of gas.	Length of exposure.	Conditions	Number of specimens.	Percentage killed.	Number of specimens.	Percentage died.
VIIA ...	% 0·3	2 hours	Pill box pinned inside tongue and groove board box.	20 bugs	% 30	...	...
VII B ...	0·3	2 hours	Pill box pinned inside tongue and groove board box	50 eggs	16	60 eggs	...
VIIc ...	0·3	2 hours	Pill box inside cotton wool and flannel roll.	20 bugs	100	...	...
VII D ...	0·3	2 hours	Pill box inside cotton wool and flannel roll.	10 eggs	100	23 eggs	...
VII E, I(a)	0·3	2 hours	Voile bag suspended at top of Tube I.	10 bugs	100	...	...
VII E, I(b)	0·3	2 hours	Voile bag suspended in middle of Tube I	10 bugs	100	...	...
VII E, I(b <sup>1</sup> )	0·3	2 hours	Voile bag suspended in middle of Tube I	25 eggs	100	23 eggs (same as used in VII D)	...
VII E, I(c)	0·3	2 hours	Voile bag suspended at bottom of Tube I	10 bugs	100	...	...
VII E, II(a)	0·3	2 hours	Voile bag suspended at top of Tube II.	10 bugs	100	...	...
VII E, II(b)	0·3	2 hours	Voile bag suspended in middle of Tube II	10 bugs	90	...	...
VII E, II(b <sup>1</sup> )	0·3	2 hours	Voile bag suspended in middle of Tube II	25 eggs	32	23 eggs (same as used in VII D)	...
VII E, II(c)	0·3	2 hours	Voile bag suspended at bottom of Tube II	10 bugs	10	...	...
VII F ...	0·3	2 hours	Pill box inside life-belt	20 bugs	100	...	...

This section shows that even 0.3 per cent. of the gas failed to kill bugs behind tongue and groove boarding in two hours. This concentration also failed, in that period, to penetrate even to the middle of Tube II in sufficient quantity to kill the bugs. It did, however, succeed in killing completely all those bugs placed inside the flannel and cotton wool roll, in Tube I (the tube open at both ends), and in the interior of the Life-Jacket (Experiment VII).

TABLE II—*Continued.*  
Section C, Experiment VIII.

No. of experiment.	Conditions of experiments.			Experimental material.		Control material.	
	Average concentration of gas.	Length of exposure.	Conditions.	Number of specimens.	Percentage killed.	Number of specimens.	Percentage died.
IIA ...	% 0.3	3 hours	Pill box pinned inside tongue and groove board box.	10 bugs	% 40	...	% ...
IIB (a)	0.3	3 hours	Voile bag at end of Tube II, furthest from the gas.	10 bugs	100	...	...
IIB (b)...	0.3	3 hours	Voile bag in middle of Tube II	10 bugs	100	...	...
IIB (b <sup>1</sup> )	0.3	3 hours	Voile bag in middle of Tube II.	20 eggs	100	8 eggs	0
IIB (c)	0.3	3 hours	Voile bag at end of Tube II nearest the gas.	10 bugs	100	...	...
IIC (a)...	0.3	3 hours	Voile bag pinned at top of groove of tongue and groove board box.	10 bugs	50	...	...
IIC (b)	0.3	3 hours	Voile bag pinned in middle of groove of tongue and groove board box	10 bugs	50	...	...
IIC (b <sup>1</sup> )	0.3	3 hours	Voile bag pinned in middle of groove of tongue and groove board box.	20 eggs	40	8 eggs (used in VIII B (b <sup>1</sup> ))	0
IIC (c)	0.3	3 hours	Voile bag pinned at bottom of groove of tongue and groove board box.	10 bugs	90	...	...

Here it is shown that a period of three hours, even, was not sufficient for 0·3 per cent. of the gas to kill the bugs behind tongue and groove boarding, although it did allow the gas to penetrate into Tube II, when placed horizontally, in sufficient concentration to kill all the bugs in it (Experiment VIII).

An interesting fact, brought out by the experiments summarised in the above two tables, is that the eggs of bugs are not more resistant to the action of Hydrogen Cyanide than are the other stages.

TABLE III.  
Summary of Experiments on Bed Bugs (*Cimex lectularius*).  
Experiments IX-XI.

No. of experiment.	Conditions of Experiments.			Experimental material.	
	Average concentration of gas.	Length of exposure.	Conditions.	Number of specimens.	Percentage killed
IXA ...	% 0·3	2 hours	Pill box at top of groove of tongue and groove board box.	10 bugs	% 10
IXB ...	0·3	2 hours	Pill box in middle of groove of tongue and groove board box.	10 bugs	20
IXC ...	0·3	2 hours	Pill box at bottom of groove of tongue and groove board box.	10 bugs	0
IXD ...	0·3	2 hours	Pill box in roll of cotton wool and flannel.	10 bugs	100
IXE ...	0·3	2 hours	Pill box in a food-locker ... ..	10 bugs	70
IXF ...	0·3	2 hours	Pill box on a table in small mess-room.	10 bugs	90
IXG ...	0·3	2 hours	Pill box on a beam under ceiling ...	10 bugs	100
IXH ...	0·3	2 hours	Pill box on a beam under ceiling ...	10 bugs	100
IXI ...	0·3	2 hours	Pill box unprotected, near to IXD ...	10 bugs	100
IXK ...	0·3	2 hours	Pill box in straw stuffing of mattress	10 bugs	100
XA ...	0·27	3-3½ hours	Pill box behind skirting board of cabin.	10 bugs	100
XB ...	0·27	3-3½ hours	Pill box on table in same cabin as XA	14 bugs	100
XC ...	0·27	3-3½ hours	Pill box in cupboard in cabin. ...	10 bugs	100
XD ...	0·27	3-3½ hours	Pill box on table in same cabin as Xc	10 bugs	100



TABLE III—*continued.*

No. of experiment.	Conditions of Experiments.			Experimental material	
	Average concentration of gas	Lengths of exposure.	Conditions	Number of specimens	Percentage killed
XIA ...	% 0·20	3-3½ hours	} Pill boxes in locker	10 bugs	% 90
XIB ...	0·20	3-3½ hours		10 bugs	70
XIC ...	0·20	3-3½ hours	} Pill boxes on chests near locker	10 bugs	100
XID ...	0·20	3-3½ hours		10 bugs	100
XIE ...	0·20	3-3½ hours	Pill box in space under bottom drawer of chest of drawers	10 bugs	100
XIF ...	0·20	3-3½ hours	Pill box in bottom drawer of chest of drawers	10 bugs	80
XIG ...	0·20	3-3½ hours	Pill box on shelf in same cabin as XIE and XIF	10 bugs	100

The experiments summarised in this table were carried out on various ships; in the first one, fumigation was effected by the dumping method, and in the second and third ones, by using liquid Cyanide with a spray.

In Experiment IX, the concentration was calculated at about 0·3 per cent. of the gas, and the fumigation lasted about two hours; this failed, again, to kill the bugs behind the tongue and groove boarding; it failed, also, to penetrate into a food-locker. This experiment illustrates the disadvantage of the dumping method, in that the concentration of the gas is not distributed uniformly throughout the space to be fumigated; thus, whilst bugs in various positions, including the interior of a straw-stuffed mattress, were killed, some exposed on a table in a small mess-room just off the main one (see fig. 6, p. 107) were not killed.

In Experiment X, a concentration of about 0·27 per cent., acting for three to three-and-a-half hours, was completely successful, all the bugs being killed; the protection afforded was not very great, the skirting-board being open at the bottom, and the cupboard (C) not very airtight.

Experiment XI shows, again, that a concentration of 0·2 per cent., even when acting for three to three-and-a-half hours, is too low to kill bugs if any kind of protection is afforded (e.g., *A*, *B* and *F*), although it does kill those exposed.

TABLE IV.  
Summary of Experiments on Lice, Fleas, and Rats.

No. of experiment.	Conditions of Experiments.			Material.	Results.
	Average concentration of gas.	Lengths of exposure.	Conditions.		
IIIA ...	% 0·3	2 hours	In pill box in petri-dish filled with cotton wool	Head lice eggs ...	All were killed. <i>Control.</i> Eggs were normal.
IIIB ...	0·3	2 hours	In pill box in petri-dish filled with cotton wool	Body lice ...	All were killed.
IVE ...	0·2	3 hours	In glass-bottomed paste-board pill-boxes	Head louse eggs	None were killed.
IVF ...	0·2	3 hours	In garment stuffed into glass jar	Body lice ...	None were killed.
VE ...	0·2	3 hours	In an iron cage ...	3 black rats ...	All killed—13 dead fleas found
VI A ...	0·2	3 hours	In a stout calico bag ...	15 black rats	All killed—8 dead fleas found.
VI B ...	0·2	3 hours	Rat's nest wrapped up in paper pierced by slits	Fleas and larvae	1 flea and 2 fleas found dead
VI C ...	0·2	3 hours	In a small glass tube plugged with cotton wool, inside the rat's nest	10 flea larvae	10 larvae all dead. <i>Controls</i> remain alive.
IXL ...	0·3	2 hours	In a cage on the floor	4 black rats ...	{ All were killed and 2 fleas and a number of larvae were found dead on the rats.
IXM ...	0·3	2 hours	In a cage on a bench ...	3 black rats ...	

From this table it appears that, in the case of lice, a concentration of 0·3 per cent., for one hour, was sufficient to kill both adults and eggs (Experiment III), whilst a concentration of 0·2 per cent., for three hours, was not sufficient (Experiment IV). It is interesting to note that a few of the lice used in this experiment, on the 13th of June,

were still alive on the 20th, having spent the seven days off the human body at ordinary room temperature, without any food. They were all dead on June 21st.

Both fleas (adults and larvæ), and rats, are killed by a concentration of 0·2 per cent., for three hours (Experiments V, VI, and IX).

### Summary.

1. A concentration of 0·2 per cent. of Hydrogen Cyanide does not, even if allowed to act for as long as three hours, with certainty kill every bug.

2. A concentration of 0·3 per cent. of the gas, acting for only one hour, is not sufficient to kill every bug.

3. A concentration of 0·3 per cent. of the gas, acting for three hours, will kill all the bugs present, except where they can retire behind tongue and groove boarding.

4. Eggs of bugs are not more resistant to Hydrogen Cyanide than are the adults.

5. A concentration of 0·3 percent. of the gas, acting for one hour, is sufficient to kill lice, both adults and eggs; but a concentration of 0·2 per cent. of gas, even acting for three hours, does not do so.

6. A concentration of 0·2 per cent. of the gas, acting for three hours, is sufficient to kill both fleas (adults and larvæ), and rats.

7. Spraying with liquid Cyanide gives better results than does the dumping method, in that it tends to give a more uniform concentration throughout the area, although not ensuring this absolutely.

### Recommendations.

1. That a concentration of 0·3 per cent. of Hydrogen Cyanide, acting for a period of three hours, should be used.

2. That where tongue and groove match-boarding is present, one or two boards should, if possible, be removed, in order to allow the gas easy access into the cavity behind.

3. That where bunks with hollow metal frames are present, they should be taken to pieces, when this is practicable, and the tubular portions laid horizontally, so that the gas can penetrate easily into their interior. Or better, as a preventative, the ends of the tubing should be hermetically sealed, as illustrated on Plate I, fig. 1.



## NOTE ON LETHAL CHAMBER AND CHEMICAL METHODS EMPLOYED

BY

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The material to be treated was placed inside a rectangular wooden chamber of internal dimensions  $100 \times 60 \times 60$  cms., closed with a lid, which, when clamped in position, rendered it air-tight. On the floor of the chamber and in one corner was placed a large porcelain dish containing dilute sulphuric acid. The lid was closed and the necessary quantity of potassium cyanide solution was run into the dish from a dropping funnel through a bent glass delivery tube passing through the wall of the chamber.

Two minutes later, sodium carbonate solution was run in from the same funnel, this being in order to expel all dissolved hydrogen cyanide gas from solution.

In the top of the opposite wall of the chamber was a glass delivery tube connected to a long length of india-rubber tubing. This and the inlet tube were now firmly clamped and the material left exposed for the time of the experiment.

In opening up the chamber the inlet tube was attached to a foot-bellows and slight pressure applied. Both clamps were now removed and air blown through for 15 minutes. At the end of this period the box could safely be opened.

To give a concentration of 0.3 per cent. HCN gas in the chamber, the following reagents were used:—

15 c.cs.  $\text{H}_2\text{SO}_4$  (1 in 3 by volume).

3.2 grms. KCN (98 per cent.) dissolved in about 20 c.cs. of water.

followed by:—

20 c.c. of a 10 per cent.  $\text{Na}_2\text{CO}_3$  solution.



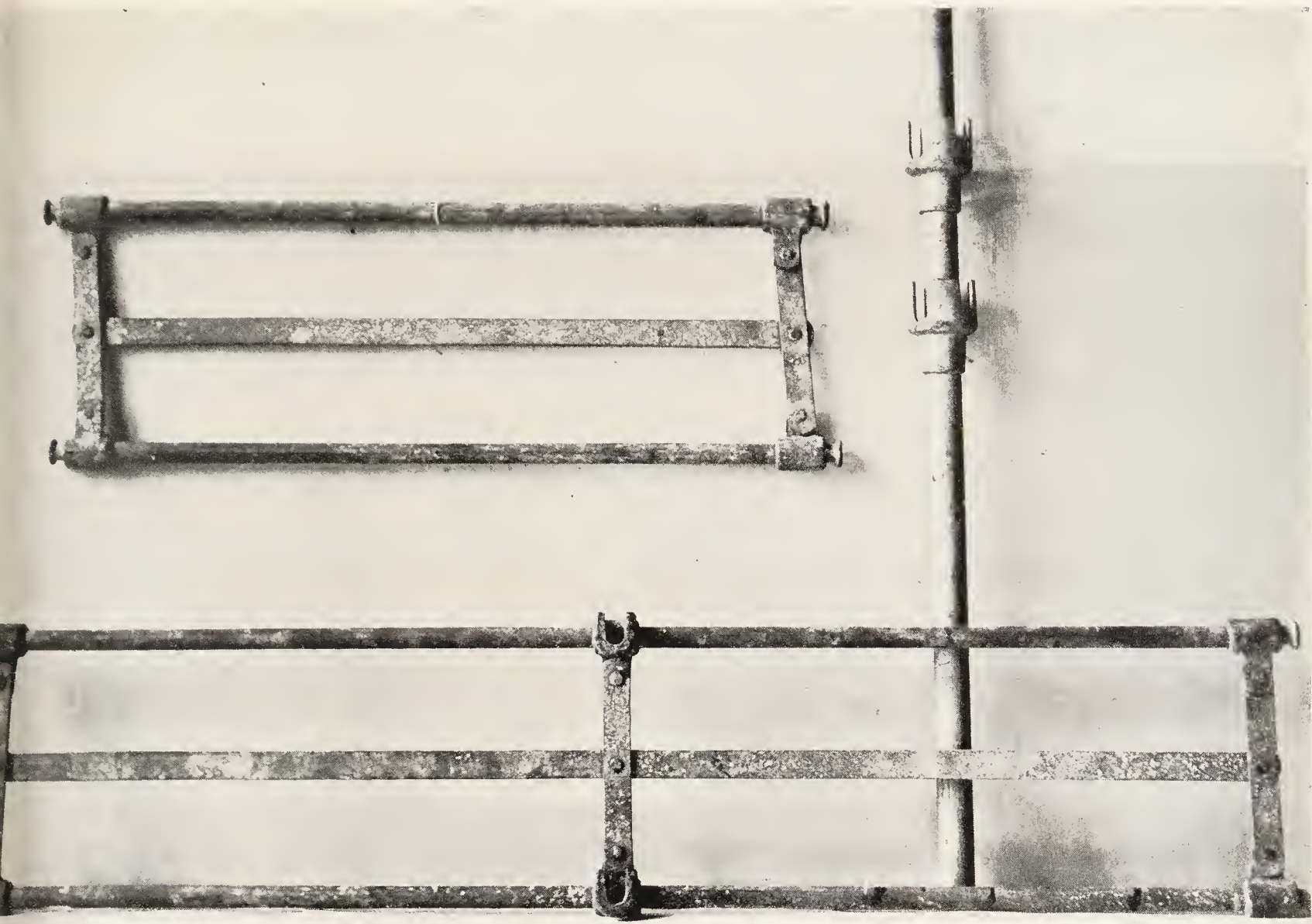


FIG. I.

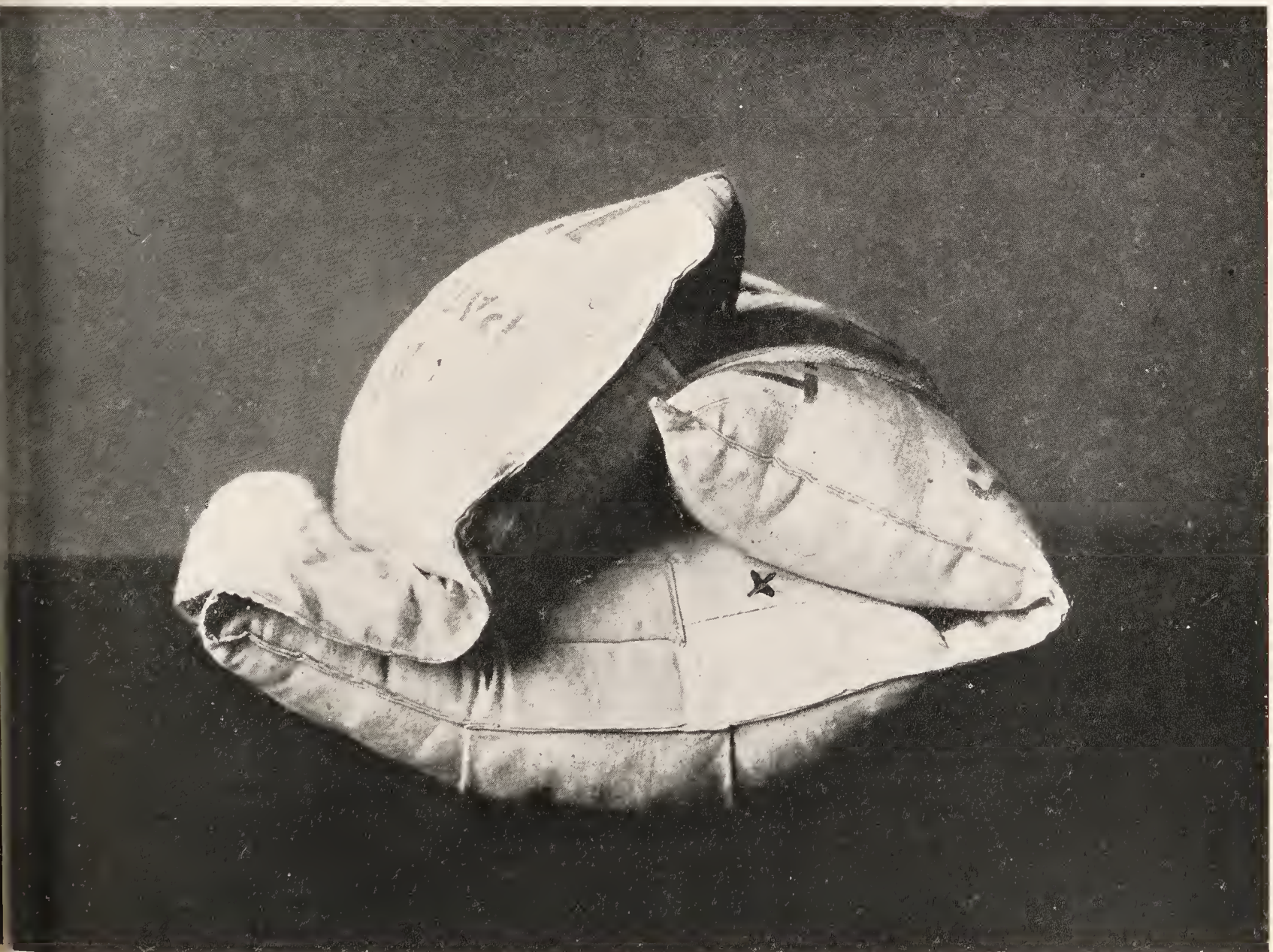


FIG. II.



